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NOTICES:—All communications relating to editorial matter should be addressed to the Editor, who will be pleased to consider articles or contributions dealing with modern chemical developments or suggestions bearing upon the advancement of the chemical industry in this country. Communications relating to advertisements or general matters should be addressed to the Manager.

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A Chapter of Dyestuffs History

THE exhaustive report on the British Dyestuffs Industry, from which further extracts are published this week, makes one point clear at the outset. The modern synthetic dye industry began in 1856 with Perkin's discovery of mauvine. Twenty years later the British industry was still in a flourishing condition, though there were signs that the lead in the industry, if not in the science, of dyes was passing to Germany. Some recovery was promised when, in 1887, the colour primuline was discovered by Professor A. G. Green, but within a short time a similar colour was produced and marketed by a German firm, and by rapid stages thenceforward the industry was lost. Of the most definite and least disputed causes the committee fixes on two. The first was the lack of equitable reciprocity in the patent laws of this country and Germany, which placed the Germans in an advantageous position, so that German patents were refused to British inventors, while Germans in this country were granted British patents. The second was the refusal by the Government to British dye manufacturers of the use

duty free of industrial alcohol throughout a long and critical period during which the Germans, having the advantage of duty free alcohol, were able to produce dyes at a correspondingly lower price than British manufacturers. Auxiliary causes included a certain slackness and lack of organisation on the part of British manufacturers, who were content to issue circulars where the Germans sent out travellers who were not only salesmen but skilled chemists, and a lack of properly-directed scientific research.

That, shortly, is the history of our failure in synthetic dye production. Are we now, as the result of our organisation during the war, on the way to a recovery, if not of our original pre-eminence, of something like self-dependence at least and equality with other dye-producing countries? On this point, the Report gives no definite answer. Its findings are to a large extent colourless and inconclusive. Advantage and disadvantage are so balanced against each other as to leave us without real guidance. The amalgamation of British Dyes, Ltd., with Levenstein, Ltd., into a single concern was, all things considered, "in the best interests of the industry, its customers, and the nation," we are told. The amalgamation of the two concerns promises economies in management costs, overhead charges, and selling expenses; increased efficiency due to large scale production and unified buying; and general advantages in the shape of pooled knowledge and experience, centralised research, better use of by-products, and greater financial and commercial competing strength. Yet a moment later we are told that the success which has attended the operations of several independent dye-making concerns suggests that the advantages of centralisation may easily be exaggerated; that the separate existence of these concerns affords a salutary check on the Corporation's costs of production, and a safeguard against abuse of monopoly; and that a policy of absorption which would result in only a negligible proportion of the industry being left outside the Corporation would be undesirable. Again, in one paragraph it is stated that the Corporation may come to be in a position to exert a monopolistic influence over the supply of dyes and dyestuffs in this country, and in the next "safeguarding" clauses are quoted to show how "the use of monopolistic power to enforce prices yielding unreasonable profits" may be prevented. So it is all through the report—what is conceded with one hand is promptly withdrawn with the other, until in the end it is impossible to say whether our policy is a success or a failure or something between the two.

While the sub-committee refuses to condemn anything outright, always finding some reasonable and innocent explanation for everything that has happened, it does definitely admit in its concluding recommendations that the present position is far from satisfactory.

While it is "inclined" to the opinion—a notably cautious way of putting it—that the policy represented by the formation of the Corporation was and is a right one, it warns us in the same breath that the giant concern is not necessarily more efficient, enterprising, or economical in each separate department of its manufacturing operations than the smaller inter-competing concerns. It definitely recommends that nothing should be allowed to enter into the constitution and practices of the Corporation which would enable it to prejudice or disable the competing power of other British manufacturers of dyes nor should it be accorded preferential treatment; though, here again, the freedom of the Corporation to meet any action by other manufacturers contrary to the interests of the consumer must not be hampered. And finally, it is urged that, in order to secure co-ordination of production, pooling of research and its results, and the pursuance of a common policy, an association of dye manufacturers should be formed, or the consultative and advisory committee proposed in the Dyestuffs Act should be developed in this direction. In a word, our great dyestuffs combine must be continued, and at the same time independent and competing manufacture must be encouraged; protection and free trade must work harmoniously together. It is of no use to blame the Committee for failing to see a clear way out. Nobody can. The position must be allowed to work itself out within the next few years, and in that period the industry may have some critical stages to go through.

Power Alcohol Developments

It was towards the latter end of 1918 that Mr. Walter Long, now Lord Long, appointed a special Committee to inquire into and report upon the possibility of establishing the manufacture of power alcohol in quantities sufficient to have an appreciable influence on the supplies of motor fuel in this country. After three years we are no nearer a solution of the problem, and from the Report which the Committee issued in 1919 it would seem that the prospects are not hopeful. Eventually the whole matter was placed in the hands of the Fuel Research Board, who recommended the appointment as Power Alcohol Investigation Officer of Sir Frederic Nathan, who since his appointment has devoted his whole time to inquiries into the various questions involved.

Sir George Beilby, in speaking recently of the progress made by Sir Frederic Nathan, drew attention to the experiments lately carried out in connection with artichokes, and stated that very good yields of alcohol per acre have been obtained. These experiments are being repeated this year; and—if the previous year's results are confirmed—it may be desirable to consider the possibility of growing this tuber to supply a limited quantity of alcohol for special purposes, such as aviation. It is of interest to note that examination of the artichoke stems has indicated that it may be possible to convert them by a simple treatment into paper pulp, in which case both products would be cheapened. As regards the Colonies the investigations, so far as they have gone, appear to show that in the sugar-growing countries a good deal of molasses is being wasted, although the quantity of

alcohol which could be derived from this would in itself be comparatively small.

Incidentally, it is to be noted that the use of cellulosic materials is not yet possible; for, although research work is in hand with a view to the discovery of a process which could be employed on a commercial scale in those localities where such materials exist in sufficient abundance, it has not yet led to any definite results. Where, however, materials capable of easy hydrolysis exist (*e.g.*, wasterice straw), recent large-scale experiments carried out by the Burmah Oil Company indicate that the joint production of alcohol and paper should be a commercial possibility. As Sir George Beilby remarks, however, until alcohol can be manufactured from waste materials which can be collected and treated at small cost, it does not seem probable that Empire-produced alcohol can be imported into this country on any considerable scale. Meanwhile, it is interesting to note that some new provisions have been inserted in the Finance Bill for the purpose of facilitating the use of alcohol for power purposes. Broadly, the Customs authorities are permitted to modify and relax where necessary any of the provisions of the existing law as they apply to the importation, removal, storage and use of substances employed in the manufacture of industrial alcohol.

Economy in Steam Raising

THE steam boiler may be said to be essential on almost all chemical works from the smallest to the largest, but it is one of those familiar pieces of plant which receives special attention only in very rare instances. Unfortunately, there is a great deal of apathy in connexion with the conservation of fuel and the economic production and application of steam, although the modern chemical work's manager is rapidly appreciating the necessity for equipping himself with a good practical knowledge of engineering. As an example of the opportunities which are provided for gaining knowledge from the experience of others may be quoted the annual memorandum which is issued by the chief engineer of the Manchester Steam Users' Association. This Report is usually particularly full of important practical suggestions, and attention is drawn to the obvious methods of economy which are so often neglected. In the latest memorandum issued, for instance, mention is made of the utilisation of the heat of waste steam, which is frequently in excess of the total requirements of the works. By displacing coal with waste heat the cost of power could be appreciably lowered, and low-pressure steam could be used in large quantities for heating drying surfaces, more especially cylinders in bleach, print, and dye works.

Another outlet for waste steam is in the purification of water in print and dye works, which are ordinarily located near pure-water supplies in which, however, quite small quantities of lime salts destroy both dyes and soaps, while even the non-sedimentary salts have their objections. It is interesting to have the opinion that the production of distilled water by condensing steam is a costly process. With coal at 36s. per ton the cost amounts to 20s. per 1,000 gallons; but, by the application of suction and pressure to the vapour

of water, the cost of producing distilled water can be reduced to 1 per cent. of the above figure, i.e., 2½d. per 1,000 gallons. The system has been recently revived, but the working results have by no means reached perfection.

So far as the everyday operation of boilers is concerned, the Report draws attention to the considerable importance of the character of the water used, and contains analyses of 150 different types of water from all parts of the country, giving, moreover, a description of the treatment recommended for each. It is stated that a compound which effects the removal of temporary and permanent hardness without substituting dissolved and non-sedimentary salts is barium aluminate. It is, however, expensive, difficult to obtain, and poisonous, and should on no account be used where there is any danger of the water being used for drinking purposes.

Safeguarding of Industries

It may be well to dispel in advance two possible illusions respecting the Safeguarding of Industries Bill. The further postponement this week of the discussion of the measure in Committee of the House of Commons need not be taken as any weakening of the intention of the promoters to push the Bill through. It is clear that the Government command the necessary votes for the purpose, and therefore feel safe in delaying progress with the Bill for a few days. People at all familiar with the Parliamentary situation will base no deceptive hopes on the action of the Leader of the House. On the other hand, British manufacturers will do well to avoid any extravagant faith in the power of the measure to bring prosperity to threatened British industries. It gives no constructive help to any single industry, nor does it ultimately promise success to British manufactures on any other ground than that of their own efficiency. All it does, as its supporters are careful to point out in their defence of it, is to restrict competition to such an extent as to guarantee for a certain period something like equal conditions. The worst thing that could happen to British manufacturers would be that they should rely on this Bill to relieve them of the responsibility of fighting their own battles. Free Trade supporters of the Bill, like Sir Alfred Mond, disclaim any idea of abandoning their Free Trade principles; they merely modify them for a time to meet exceptional conditions. Ultimately British manufacturers must meet foreign manufacturers in the open and on level terms, and it is well they should understand clearly that no fiscal devices can protect them from the inevitable consequences of inefficiency.

There is one small concession announced by the President of the Board of Trade which traders will appreciate. While he refuses to defer the operation of the Bill until the beginning of the new year, he has undertaken not to bring it into force before September 30. This will give merchants some little margin, instead of immediately holding up trade by a fear that the Act may take effect immediately it is passed. In any case, it is almost certain that a period of grace will be allowed for completing existing commitments.

Reparation Policy

THE letter from the Foreign Office to the Chemical & Dyestuff Traders Association published on another page clears up one point which has caused considerable uncertainty. The German Ministry of Finance, as the result of representations addressed direct to the German Embassy and indirectly through Government Departments, has issued an official notice to the effect that their undertaking to reimburse to the extent of 26 per cent. German exporters who accept 74 per cent. of the invoice value of goods from British importers will operate from May 12. This will put a final end to the German policy of demanding the full value of the goods, and enable normal trade to be resumed between Germany and the United Kingdom, in spite of the Reparation levy. On another point no assurance has yet been given. Germany has undertaken to put an export tax of 26 per cent. on all goods sent to countries other than the United Kingdom, so that neutral countries shall not obtain German goods on preferential terms as against ourselves. Some doubts have arisen as to whether this arrangement is in operation, and British traders may be congratulated on having brought the matter to the notice of the Foreign Office and induced it to take action.

In the meantime, Captain Wedgwood Benn, from the point of view of freedom of trade, continues to put some useful questions in the House. It appears to be considered a virtue on the part of the Government that the staff responsible for dealing with goods imported under the Reparation Act has not been augmented to any appreciable extent, and that the administration of the Act is costing virtually nothing. In another way, however, it is costing this country a considerable amount, for owing to the inability of the normal staff to cope with the exceptional volume of work, goods are held up for considerable periods at the port of entry, and business—difficult enough to obtain under present conditions—is correspondingly obstructed. When the Safeguarding of Industries Bill comes into force one may expect to hear more of these difficulties, unless there is a considerable augmentation of staff.

The Calendar

July 14	Royal Society of Arts : "Paints, Painting and Painters, with Reference to Technical Problems, Public Interests and Health," by Professor H. E. Armstrong and A. C. Klein. 8 p.m.	John Street, Adelphi London.
Aug. 29	Society of Chemical Industry : Annual General Meeting. 11 a.m.	McGill University, Canada.
6	North of England Institute of Mining and Mechanical Engineers : Annual Meeting. 2.0 p.m.	Newcastle-on-Tyne.
13 Sept. 7-14	The Mining Institute of Scotland: General Meeting. British Association for the Advancement of Science : 89th Annual Meeting : "Some Aspects and Problems of Post-war Science, Pure and Applied," by Sir Edward Thorpe, the President.	Glasgow. Edinburgh.

National Dyestuffs Industry for Britain—(I.)

Review of Government Policy and Results

Last week we published the conclusions of a sub-committee appointed by the Standing Committee on Trusts "to ascertain to what extent supplies, prices, and costs of dyes and dyestuffs in this country and profits thereon are affected by any trade combination." The report (Cmd. 1370, 4d.) in which these conclusions appear reviews the development of the dyestuffs manufacturing industry in this country since the outbreak of the war, and deals in considerable detail with the formation of the British Dyestuffs Corporation. The following extracts are taken from it.

The Pre-War Position

THE history of the modern synthetic dye industry may be said to begin with the discovery, in 1856, by W. H. Perkin, of a synthetic colour which he named mauveine. Perkin began the manufacture of this colour on a commercial basis, and investigations with a view to the discovery of further synthetic dyes were pursued by Perkin, Hofman and other members of the Royal College of Chemistry. It will be noted, therefore, that the synthetic dye was, in the first instance, a British discovery.

Recognition of the importance of the new discovery was not confined to this country; German chemists in particular were alive to its significance and promise. Three or four years later Professor Hofman, of the Royal College of Chemistry, was induced to return to Germany, where German chemists appear immediately to have taken up the synthetic colour branch of organic chemistry. Many of these German chemists had been employed in England or had learnt the essentials of dyestuffs manufacture in this country, and they returned to Germany with their knowledge. Up to 1875, however, the British industry was in a flourishing condition, and held its own fairly well against foreign competition, although there were already signs that the lead in the industry, if not in the science of dyes, was passing to Germany. There was some prospect of a recovery when, in 1887, the colour primuline was discovered by Professor A. G. Green, at that time chemist to the firm of Messrs. Brooke, Simpson & Spiller. Primuline, it was plain, was but one of a new series of dyestuffs, and in the belief that its chemical composition and structure could not be ascertained by analysis, Messrs. Brooke, Simpson & Spiller determined not to take out a patent, but to reserve to themselves the rights in the new line of colour by manufacturing under conditions of secrecy. Unfortunately, however, within a very short time of primuline being placed on the British market, a similar colour was produced and marketed by a German firm.

Why We Lost the Industry

The loss of the dyestuffs manufacturing industry to this country is attributed to a variety of causes. The two most definite and least disputed of these causes are concerned with patents and the use of industrial alcohol. On the one hand, lack of equitable reciprocity in the patent laws of this country and Germany placed the Germans in an advantageous position, so that German patents were refused to British inventors, while Germans in this country were granted British patents. On the other hand, British dye manufacturers were refused by the Government the use, duty free, of industrial alcohol throughout a long and critical period during which the Germans, having the advantage of duty-free alcohol, were able to produce dyes at a correspondingly lower price than British manufacturers. Further to these it has been said that in the early days there was a certain slackness and a lack of organisation on the part of the British manufacturers, who were content, for instance, to send out circulars whilst the Germans sent out travellers who were not only salesmen but skilled chemists; and it is asserted that the whole course of the development of synthetic dyes in this country subsequent to the initial discovery exhibits a lack of properly directed scientific research. But whether these were contributory causes of the passing of the dyes industry out of this country, or whether they were accompaniments or results of the heavy handicap of unfair patent arrangements and unintelligent provision as regards the use of industrial alcohol, is a matter on which there are differences of opinion.

The completeness with which, just prior to the war, the industry had passed from this country to Germany will be realised from the fact that, in 1913, of the annual consumption of 20,000 tons of synthetic dyes and dyestuffs in the United

Kingdom, 18,000 tons valued at £1,890,000 were imported. Of this total over 90 per cent. came from Germany and the remainder from Switzerland. The contribution made by British dye-making firms towards supplying the national requirements was therefore trifling, and it has been held that even these flourished only because their existence was tolerated by the great German companies. As regards aniline oil and sulphur black—two comparatively simple but greatly used commodities—British manufacturers had entered into national conventions in which the dominant influence was that of the German companies. The only British makers of alizarine were also members of an international alizarine convention, but here the case is somewhat exceptional in that they were strong enough to force their way into the convention on their own merits. As regards the remainder of the dyes manufactured in the United Kingdom, it would be broadly true to say that the German manufacturers could have driven the British makers out of the market at any time had they chosen to do so.

There were two works in this country owned by German companies, viz.: The Ellesmere Port Works of Meister, Lucius & Brünig, and the Mersey Chemical Works owned jointly by three German companies. These factories had, however, been established primarily to meet the requirements of the Patents Act of 1907, and their operations were on a comparatively small scale. In the case of the Ellesmere Port Works—which were engaged in the production of synthetic indigo—only the final process was carried on at the British works with materials furnished mainly from Germany.

The extent to which the coal-tar dye industry had become centred in Germany before the war is a matter of common knowledge. It has been estimated that in 1913 Germany produced 80 per cent. of the world's consumption of artificial dyes, and over half of the materials needed to make the remainder. In 1912 there were 16 ostensibly independent firms in Germany manufacturing coal-tar dyes. Nine-tenths of the output of these firms was, however, controlled by five large concerns. Even as between one and another of these concerns there were interlocking interests and the position at the outbreak of war was that the German dye industry was massed in two great groups, the Höchst-Cassella Group and the Badische Group.

These German firms, as well as the four principal Swiss manufacturers, were represented in this country either by subsidiary (distributing) companies or by agents who were not only distributors but were also of substantial use to British consumers in advising them on the best methods of employing their dyestuffs in the various dyeing processes. The competition between the German companies was not so much in price as in brands of dyes, and one effect of this form of competition was the great variety of brands of dyes, running into several thousands, which were available on the British market.

Emergency Supplies during the War

Thus in 1914 the United Kingdom was practically dependent on Germany for its supplies of synthetic dyestuffs. The outbreak of hostilities occurred at a time when stocks of dyestuffs in this country were low, and the British textile industries, together with other industries dependent upon supplies of synthetic dyestuffs, found themselves in a very serious position. From the very commencement of the war, therefore, the Government had to take special action to ensure supplies of dyes for this country.

From the first, however, the Board of Trade were of opinion that if the home production of synthetic dyes was to be increased at a rate sufficient to ensure to the great dye consuming trades, in the event of a protracted war, a supply which would enable them to carry on, and that if the opportunity offered by war circumstances to lay the foundations of an industry of

the very greatest importance from the military as well as the industrial point of view was to be seized, further State action would be necessary.

Early in the war, therefore, the Government undertook to advance for development purposes £200,000, bearing a low rate of interest, to Messrs. Read Holliday & Co., a Huddersfield company engaged in the manufacture of synthetic dyes. This was the original scheme, but after discussion with representative dye users, it was eventually decided that a preferable course would be to form a new company capitalised on a scale commensurate with the magnitude and importance of the project. The Government would subscribe part of the capital, but the whole of the ordinary capital would be subscribed by dye users so that, in effect, there would be formed a producing co-operative company of dye consumers who would be less interested in the profits earned by the company than the security of their supplies of colours.

Formation of British Dyes, Limited

Accordingly, in 1915, British Dyes, Limited, was formed, the Government undertaking to advance on debenture to the company a sum of £1 for every £1 of ordinary share capital subscribed up to £1,000,000, and thereafter a further £1 for each £4 of additional share capital subscribed up to a maximum of £500,000. Thus, if the amount originally contemplated was eventually subscribed, the company would have a capital of £4,500,000 made up of £3,000,000 ordinary capital held by dye users, and £1,500,000 Government debentures. The loan of £200,000 originally promised by the Government to Read Holliday & Sons, Ltd., for development purposes was ultimately confirmed to British Dyes, Ltd., and consequently the amount due from the Government on debenture security was raised to £1,700,000. The latter was to bear interest at 4 per cent. per annum and to be repayable in 25 years, the interest for the first five years being payable only out of profits and non-cumulative. The dividend payable by the company was limited to 6 per cent. per annum so long as any portion of the Government advance was outstanding. The Government also granted to the company the sum of £100,000 for research purposes, to be paid as and when required over a period of 10 years. There were to be two Government directors on the Board and provision was made in the Articles of Association to secure the permanent British character of the company and to give the Government the right of intervention if the prices charged by the company were unreasonable or if there were any unreasonable differentiation in the distribution of its products. The new company acquired, at the outset, the undertaking of Messrs. Read Holliday & Sons, Ltd., of Huddersfield, and negotiations were entered into for the acquisition of Messrs. Levinstein, Ltd., of Manchester, but these negotiations were unsuccessful.

Progress in Dyes Manufacture

The progress of British Dyes, Limited, was affected to some extent by the fact that the Company was called upon by the Ministry of Munitions of War to devote much of its energies to the manufacture of explosives. Nevertheless, considerable progress was made by the company in the actual manufacture of dyes, in the erection of buildings, and the designing and erection of plant for the manufacture, not only of dyes, but of a wide range of intermediates. Meanwhile, other companies, without assistance from the Government, were making considerable progress, the largest and most enterprising of these being Messrs. Levinstein, Limited, of Manchester. This company acquired in 1916 the works of Messrs. Claus & Co., of Manchester, who were producing successfully a limited range of dyes; and also, at a later date, under the Trading with the Enemy Act, the Ellesmere Port Works of the German manufacturers, Meister Lucius & Brüning, and at this latter factory they were able to develop the manufacture of synthetic indigo on a substantial scale.

Considerable progress was also made by the British Alizarine Company, Limited, but the operations of this company were very seriously retarded by the Silvertown explosion at an adjoining works in January, 1917, which destroyed their works at that place. Scottish Dyes Limited, of Carlisle, and other companies of more or less importance also contributed in various degrees towards meeting the demand for synthetic dyes.

Situation in 1918

In spite of these efforts, however, the situation during the early part of 1918 was regarded as far from satisfactory. Although there was a large output of dyes in this country, and sufficiently good colours were being produced to answer war purposes (uniforms, &c.), and the temporarily less exacting requirements of the home and overseas markets, yet very little progress had been made in the manufacture of the more difficult and special dyes. This fact was not of great importance for the moment, in that trade facilities were restricted and that owing to the blockade of enemy countries the choice of dye users in this country, and the buyers of textile goods, whether in this country or abroad, was confined to the products of allied and neutral countries; but supplies of such dyes would be of great importance under normal conditions when this country came once again to be faced with effective foreign competition. There was also appreciable overlapping and dispersion of effort, and it was felt by those who were chiefly concerned with the maintenance of a home supply of synthetic dyes in the years to come, that the position did not afford ground for confidence. It was clear that if the British dye industry was to hold its own after the war there must be a further strengthening and co-ordination. Strong representations to this effect were made by the principal colour users to the Board of Trade.

Formation of British Dyestuffs Corporation

Efforts were made to co-ordinate production, but it was apparent that really effective co-operation between the two largest dye-making concerns—British Dyes, Ltd., and Levinstein, Ltd.—could only be secured as a result of something in the nature of a merger of the two companies. After a number of discussions between the two companies, in which the Board of Trade took part, the two concerns agreed to establish a new company, to be known as the "British Dyestuffs Corporation, Ltd.," which would control both British Dyes, Ltd., and Levinstein, Ltd. In July, 1919, therefore, the Corporation was formed with an authorised share capital of £10,000,000, divided into 4,500,000 preference shares of £1 each, 4,500,000 preferred ordinary shares of £1 each, and 1,000,000 deferred ordinary shares of £1. The Government subscribed for 850,000 preference and 850,000 preferred ordinary shares in substitution for the loan on debentures to British Dyes, Ltd., of £1,700,000 to which they were committed. The vendor companies (British Dyes, Ltd., and Levinstein, Ltd.) received 756,481 preference, 727,281 preferred ordinary and 980,044 deferred ordinary shares, these latter being in payment for the goodwill, patent, and other rights of the two concerns; whilst 2,500,000 preference and 2,500,000 preferred ordinary shares were offered for public subscription. The new corporation acquired practically all the shares of British Dyes, Ltd., and Levinstein, Ltd.

The Board of Trade did not, however, confine its attention in this matter of the promotion of the dye-making industry to the formation of this new corporation. In November, 1919, a scheme for the provision of financial assistance to dye manufacturers was published. We understand that three dye manufacturers have received financial assistance in accordance with the terms of this scheme.

Progress of other Manufacturers

Although up to this point much of our attention has been confined to the British Dyestuffs Corporation, which is, of course, by far the largest dye-manufacturing company in this country, manufacturing 75 per cent. of the total output of dyes in the United Kingdom, many other dye manufacturers have contributed considerably to the increased output and increased efficiency of the dye-making industry in this country. Of these smaller manufacturers, we draw attention to the following companies:—

The British Alizarine Co., Ltd.—This company, which was established in 1882, has specialised in one particular type of colour, and for many years before the war competed so effectively with the German manufacturers that shortly before the war the latter were compelled to admit them into the Alizarine Convention. The company is practically owned by the United Turkey Red Co., the Calico Printers Association, Ltd., and other textile firms who are, of course, large consumers of their colours. The output of the British Alizarine Co. has been much increased during the war, and new plant and buildings are in course of erection, which will give a further large increase.

Scottish Dyes, Ltd.—This company was started by the Morton Sundour Fabrics, Ltd., for the purpose of producing the special fast colours necessary for their trade, and it is the only concern specialising in higher class dyes alone. A large amount of research work has been carried on, and the company has been successful in manufacturing a number of special vat colours in commercial quantities. It has now erected works at Grangemouth.

L. B. Holliday & Co., Ltd.—This company was established in 1916 by a former director of Read Holliday & Sons; for some time it was engaged solely in the manufacture of explosives, but when that ceased attention was turned to dye-making, and there is now a fairly large and varied output, including certain specially important colours, such as fast direct cotton colours, saffronino, methyl violet, &c. The company has erected new works at Huddersfield, which, although not comparable in magnitude with the works of the British Dyestuffs Corporation as a whole, are of considerable extent and well devised for their purpose.

Brotherton & Co., Ltd.—This company purchased, under the Trading with the Enemy Acts, the Mersey Chemical Works, formerly owned jointly by three German companies. The company's products are colours used for woollen dyeing, metachrome, afterchrome and acid colours and direct cotton colours.

Clayton Aniline Co., Ltd.—This company is owned jointly by three Swiss concerns—the Society of Chemical Industry, the Sandoz Chemical Works and J. & R. Geigy—and one of its chief activities is the manufacture of intermediates for shipment to its Swiss principals. It produces, however, large quantities of aniline oil and salt, and it is now developing the manufacture of colours.

Potential Monopoly

Notwithstanding the existence of other manufacturers it is obvious that, by the formation of the British Dyestuffs Corporation a trade combination has been formed in this country which places under one financial control something like 75 per cent. of the synthetic dye manufacture of the United Kingdom, and which might one day, given a course of development and the provision of conditions favourable thereto, be in a position to use a monopolistic influence over the supply and prices of dyes and dyestuffs in this country.

We have ascertained that the Articles of Association provided for the appointment of two Government directors who are given certain powers of veto, enable the Board of Trade to prevent shares in the corporation being held directly or indirectly by foreigners, and provide for the issue to the nominees of the Government of preference shares conferring upon the holders vote sufficient to prevent any alteration in the Articles of Association. The Articles also include the following clauses:

"*Prices.*—The company shall supply its products at reasonable prices, due regard being had to the cost of manufacture, a reasonable profit to the company and any other relevant circumstances (including the rights of the company in respect of patents) and not otherwise. If as regards any product of the company the price at which the company is supplying or proposing to supply the same is in the opinion of the Board of Trade unreasonable, the Board of Trade shall from time to time state in writing to the company what they consider to be the reasonable price of such product, regard being had to the matters aforesaid.

"*Distribution of Products.*—The company shall distribute its products of finished dyes or intermediates amongst consumers in an equitable manner and not otherwise. If and whenever as regards any such product the Board of Trade are of opinion that such distribution is not being carried out in an equitable manner, they shall state in writing to the company what they consider to be an equitable manner of distribution."

In general, we are of opinion that, so far as any possibility of the Corporation using its predominance to extort prices yielding high profits is concerned, the constitution of the Corporation provides against any such eventuality much more fully than would be the case were it an ordinary joint-stock company. As regards equity of distribution, one case was brought to our notice in which certain large users of one of the dyes manufactured by the Corporation have been given an unreasonably large rebate upon the price charged to smaller customers. We were assured, however, on behalf

of the Corporation that the position in regard to rebates was being regularised and that a scale of rebates covering every customer would be published.

In holding these views, we are, however, alive to the possibility that the Corporation's costs of production may for a variety of reasons be such as to compel it to ask immoderate prices of its customers if its operations are to show the "reasonable profit to the Company" referred to in the first of the above-quoted "safeguarding" clauses. Should this prove to be the case, it is perhaps conceivable that the conjunction of business and Government interests on the Board would result in the exercise of influence in the direction of protecting the Corporation against competition and so enabling it to maintain paying prices. Steps might conceivably be taken to suppress the competition of rival dye manufacturers in this country, and there would be a certain inducement to stretch to the utmost the powers conferred in any legislation providing for the exclusion or taxation of dyes manufactured abroad. The influence of the dye users represented on the Board would naturally be against the misuse of protective provisions, but theirs being a minority representation they would not be able to make their influence operative.

Capitalisation

One important factor in the price at which the Corporation is, and will be, able to sell its products, "due regard being had to a reasonable profit to the company," is the nominal amount of the capital on which dividends are to be paid, as compared with the real value of the property which that capital represents. If the Corporation is over-capitalised its ability to sell at a reasonable price, while making a reasonable profit, will be in so far diminished. We have, therefore, enquired closely into what the nominal capital of the "British Dyestuffs Corporation" originally represented and at the present time represents.

The basis of the amalgamation of the two companies was as follows:—In the case of Messrs. Levinstein, Limited, the share capital was divided into preference shares and ordinary shares. The preference shares in Messrs. Levinstein, Limited, were exchanged for preference shares in the Corporation on a par basis. The ordinary shares in Levinstein, Limited, and the ordinary shares in British Dyes, Limited, were exchanged for preference and preferred ordinary shares in equal proportions in the Corporation on the basis of a valuation of the companies' tangible assets over liabilities, in addition to which there was an agreed payment of 980,044 deferred ordinary shares, made in respect of goodwill, patent and other rights. Certain substantial sums are receivable, and have in fact been received in respect of the sale of process and other rights.

This valuation of the net assets of each company was made on the following basis:—Land was taken at cost price. Buildings, plant and machinery existing before the war were valued at cost (starting with the book value at the 30th June, 1904, and depreciated at the rate of 2½ per cent. per annum for buildings and 7½ per cent. for plant and machinery on the original value). In the case of plant and machinery, that depreciation in effect wrote off the whole of the value. Buildings, plant and machinery erected during the course of the war at each works were valued at cost less the percentages allowed by the Inland Revenue authorities for Excess Profits Duty and Munitions Levy purposes.

The effects of these writings off were as follows:—The total cost of the fixed assets of the two concerns amounted to £3,873,090, and those were valued for the purposes of merger at £2,012,000 so that approximately 50 per cent. was written off. With regard to floating assets, stocks were valued at market or cost price, whichever was lower, and all other assets (book debts, investments, cash in hand, &c.), were taken at the net realisable value. All liabilities, including full reserves for Income Tax, Excess Profits Duty and Munitions Levy, were carefully ascertained. The amalgamation accounts were prepared and certified by chartered accountants. In the valuation of the assets, both fixed and floating assets, the directors of the companies took no part.

As a result of this valuation the net value of Messrs. Levinstein's assets showed a total of £348,800 available for distribution to the ordinary shareholders, each assenting shareholder receiving his proportion of this amount one-half in preference shares and one-half in preferred ordinary shares in the Corporation. The holders of the 3,000 preference

shares of £10 each in Messrs. Levinstein received in exchange preference shares in the Corporation of an equal nominal amount or cash at their option. In addition the shareholders in Levinstein, Limited, received an allotment of 450,000 deferred ordinary shares representing the agreed value of goodwill, patent, and other rights. The net value of the assets of British Dyes, Limited, showed a total of £1,143,580 available for distribution to the ordinary shareholders, and this was satisfied as to one-half by the issue of preference shares and as to the other half by the issue of preferred ordinary shares in the Corporation. In addition the shareholders in British Dyes, Limited, were entitled to an issue of 550,000 deferred ordinary shares in respect of goodwill, patents and other rights. No cash payment was made to the amalgamating companies in addition to this allocation of shares.

Conversion Values

It has been submitted to us that, taking the share capital of the respective concerns as a basis of comparison, the holder of each £100 in British Dyes, Limited, received in British Dyestuffs Corporation shares

£59 in Preference,
£59 in Preferred Ordinary,
£56 $\frac{1}{4}$ ths in Deferred Ordinary,

Total ... £174 $\frac{1}{4}$ ths;

whilst the holder of each £100 in Levinstein, Limited, received

£290 in Preference,
£290 in Preferred Ordinary,
£750 in Deferred Ordinary,

Total ... £1,330

Expressed in this manner, the terms received by the shareholders in Messrs. Levinstein, Limited, would appear to be exceedingly favourable, but, as we have explained above, the exchange of shares was made not in respect of the nominal capital of the two several concerns, but in respect of a valuation of their respective assets. The nominal capital of Messrs. Levinstein was only £90,000, whereas their effective capital, irrespective of goodwill, patent rights, &c., according to the valuation was nearly £350,000. It has been alleged that for 15 years before the war Messrs. Levinstein's had not paid a dividend, that before the war their £10 shares were quoted at £2 10s., and that since the holder of every £10 share received £133 in Corporation shares, those who purchased Levinstein shares at £2 10s. before the war received in Corporation shares 53 times the original purchase price. In reply to these statements we are informed that Messrs. Levinstein's shares were for the most part held by members of the Levinstein family, and that the policy of the Company had in general been not to pay out profits in dividends, but to put the profits back into the business. We are satisfied from the evidence put before us that no considerable transactions had taken place in Levinstein shares in the years before the war, that the number of shares which could have changed hands at £2 10s., or any such figure, was insignificant. During 1918 and 1919 a certain number of shares changed hands. The records show that on a monthly average the shares stood at £100 in January, 1918, and rose to £147 in May, 1918, although one transfer in May, 1918, was effected at £190. In November, 1918, the nominal date of amalgamation, there were transfers at £164. In the first half of 1919 they stood at about £152.

None the less, strong representations have been made to us to the effect that Messrs. Levinstein received in Corporation shares far more than the real value of their business. For this to be the case the valuation on which the amalgamation terms were based must have been made on some basis which lent itself to inflation. The suggestion, as we understand it, is that the market value of Messrs. Levinstein's assets was conditioned by the prospects of legislation being passed which would give the dyes industry protection against foreign competition, that the Levinstein shares were converted into Corporation shares at an exchange value based on the anticipation of such legislation being passed, and that, therefore, the Government was party to Messrs. Levinstein receiving payment for a prospective value which remained to be created by the action of the Government itself. We must point out,

however, that this consideration applies equally to the shares of British Dyes, Limited, as to those of Levinstein, Limited. It can hardly be argued that the Government should have pressed for the "conversion of British Dyes shares on the assumption that a protective tariff would be imposed, and of Levinstein shares on the assumption that it would not be imposed. The contention must, therefore, resolve itself into a complaint that both concerns were converted at values inflated by the assumption that protective measures would be passed. To this it must be answered that rightly or wrongly specific pledges to introduce such legislation had already been made by the Government, and that being the case we cannot see that the conversion could have been arranged on any other assumption than that the pledges would be redeemed.

Conclusions as to Capitalisation

Our view of the capitalisation of the British Dyestuffs Corporation is that much of the plant, buildings, equipment, &c., of the two concerns erected subsequent to the amalgamation, was obtained and installed at a time when the cost of materials and labour was high and for that reason even the very conservative valuation of which particulars have been given fixed that part of the capital representing vendors' shares at a sum which would only be deemed warranted by the prospective after-war profit earning capacity of that part of the capital on the assumption that the after-war demand for the products of the Corporation would not fail to be sufficient to keep the plant fully employed, and that there would be no serious break in prices. In view of what has occurred in recent months this assumption was too optimistic, and from that point of view it may be said that the Corporation is under a burden of inflated capitalisation, on the score of plant and buildings erected at a time of high prices, but even so it is not singular therein. Every business which expanded during the later period of the war to meet war needs or to cater for after-war demands was similarly affected. We also think it highly probable that the extensions and developments which took place in the two concerns prior to the amalgamation, as also those which were affected after the amalgamation on the strength of the additional capital subscribed by the public which the Corporation was compelled to enter into in order to carry out its programme, were carried out on a more elaborate scale and with a less keen eye to getting the utmost value for the money expended than would have been the case had the developments been more gradual and had they occurred at a more normal time.

Pre-Amalgamation Profits

On the question of whether Messrs. Levinstein's shareholders received more than their due in corporation scrip we have enquired as to the profits earned by British Dyes and by Levinstein's in the period preceding the amalgamation. The prospectus of the British Dyestuffs Corporation issued in July, 1919, stated that the profits of British Dyes over the three and a half years prior to October 31st, 1918 (the nominal date of the amalgamation), and of Levinstein's over the three years and four months prior to that date were £2,226,746, after deducting Excess Profits Duty. This figure was before charging Income Tax or special writing off of capital expenditure. This amount is broadly accounted for as follows: Special writing off of capital expenditure, £1,244,505; dividends paid, £196,469; provision for Income Tax, £353,853; increase in balance of Profit and Loss Account at 31st October, 1918, over amounts at commencement of period mentioned in certificate in prospectus, £430,353.

Dinner to Mr. Ernest Benn

THE Industrial League and Council is entertaining Mr. Ernest J. P. Benn and Mr. F. H. Elliott to dinner on the occasion of their return from their trip to America. Messrs. Benn and Elliott acted as delegates from the Industrial League to the National Civic Federation of America, and this function which will take place at the Holborn Restaurant on July 14 is held for the purpose of receiving their report on industrial conditions in the United States. Employers attending the dinner, are invited, as is usual with Industrial League functions, to bring with them representatives of their workers. Tickets can be obtained on application to the General Secretary, Mr. John Ames, 82, Victoria Street, S.W.

Reviews

TANNING MATERIALS, WITH NOTES ON TANNING EXTRACT MATERIALS. By Arthur Harvey. London: Crosby Lockwood & Son. Pp. 182. 15s. net.

This volume will form a very useful addition to both the tanner's and leather chemist's library. The author, realising that information concerning tanning materials is widely disseminated through a number of publications, many of which are inaccessible to the average tanner or manufacturer, has brought such information within the scope of this volume, and has collected together in compact, readable form a great deal of very useful information. The book is divided into five sections.

In Section 1 the author deals with the chemical composition of the tannings. It is greatly to be regretted that this is not more fully gone into. It does not include any reference to the recent most important researches of Freudenberg and others.

Section 2 is undoubtedly the valuable part of the book. In this, the author gives a complete list of all the known tanning materials, with a general account of their sources; their general characteristics, together with the average analyses and behaviour both from a chemical and practical standpoint. He deals more fully with such important materials as hemlock, chestnut, valonia and mimosa, giving a short description of the manufacture of extracts from these materials. The author even includes sulphite cellulose extract amongst the number, although to include this amongst tanning materials is a doubtful compliment. It is undoubtedly used as an adjunct in the production of certain classes of leathers, and even the author states, "leather tanned with this material is of little value."

Section 3 deals with the manufacture of tanning extracts. This section, while containing a lot of useful information, is merely a synopsis of the general methods used in extract manufacture. The section outlines the modern processes, and is suitable for students of leather chemistry requiring a general idea of extract manufacture. The full references to patents and the literature on the subject are a valuable asset, but it is doubtful whether a practical extract manufacturer will find anything new.

The methods of examining tanning materials are dealt with in Section 4, in which the author gives the official methods for the sampling and analysis of all classes of tanning materials as laid down by the Society of Leather Trades Chemists.

The author deals in Section 5 with such miscellaneous subjects as the calculations of loss in bark extraction; he deals lightly with the use of spent bark as boiler fuel, the distillation of wood, and the mordanting fuel of certain tanning materials.

The volume is well illustrated, and from the point of general get-up leaves nothing to be desired. It will certainly appeal to all students of leather chemistry, and will be a useful handbook in the tanner's laboratory.

J. G. P.

TEXTBOOK OF PRACTICAL CHEMISTRY. By G. F. Hood and J. A. Carpenter. London: J. A. Churchill, 1921. Pp. 527. 21s.

A certain textbook on conic sections is known amongst undergraduates as "Potted Salmon." The volume under review will might be its chemical cousin, for a more concentrated triple extract of chemical recipes we never have met. The amount of information that has been forced into some 500 pages of most readable type is positively astonishing—covering, as it does, the skeleton of organic and inorganic chemistry. The chapters include the preparation and qualitative and quantitative analysis of both organic and inorganic compounds, together with electroanalysis, gas analysis, and some 80 pages of exercises in physical chemistry. One hardly knows which to admire the more—the industry of the authors in collating the volume, or their judicious choice of the material to hand.

The preface contains two statements that particularly call for note—the first, that the work is intended to be "a reference book in a convenient form," and the second, "a whole-hearted attempt has been made to indicate the best methods of doing everything." The reader thus will gather that the volume is a well-indexed summary rather than a handbook of practical instruction. No other purpose could have justified the

extraordinary compression that has been adopted. It is intended to supplement the teacher and not to replace him. Theoretical disquisitions are reduced to a minimum, and it is not expected that a student will open the book and simply try to learn chemistry. Should the pupil, without the kindly aid of a demonstrator, embark on the organic preparations by himself, he will find sufficient lacunæ for ingenuity in determining optimum conditions for a maximum yield. He also will discover there is no "open sesame" to chemistry made easy; the keys which unlock that door are careful work and patient attention to detail.

At times the condensation requisite for maintaining the volume within reasonable limits seems almost to have been too rigidly enforced. Adequately to describe six preparations on one and a half pages in Chapter IX is almost too great a triumph. The reviewer recollects how once he had to wade through a seemingly interminable maze of literature concerning the production of indigo from phthalic anhydride; the details of the complete process occupy in this volume 22 lines of print.

Further, had the authors lived a little more in contact with industry, possibly some of the "best methods" might have been altered for the better. To comment at length on these would be in the nature of compiling a treatise to review a textbook. Perhaps one example will suffice: α -naphthol is prepared thus (page 396): sulphionate at 80 deg. for 6 hours, fractionally crystallise the lead, barium, or calcium salts, extract with 85 per cent. alcohol, fuse the sodium sulphionate subsequently obtained with 17 molecular proportions of caustic soda at a final temperature of 310 deg., acidify with hydrochloric acid, and recrystallise from boiling water. Any manufacturer who pursued that process would soon have to interview his banker. The β -acid is described as being obtained by sulphoning at "160 deg. for several hours"—a trifle vague for a student who has neither leisure nor wish to conduct research.

However, despite the foregoing, the textbook is a noteworthy attempt to accomplish a difficult task. Sufficient addenda of literature are appended to the various sections, the diagrams are clear, misprints such as a faulty lettering of Fig. 1 are few, the type is excellent, paper good, and the binding attractive. Both authors and publishers have combined to produce a volume which merits attention and which, as far as our experience serves, is certainly unique.

D. I. J.

FACTORY CHEMISTRY. (Preparatory to Courses in Metallurgy and Metallography.) By WILLIAM H. HAWKES, A.B., M.Sc. London: Longmans, Green & Co. Pp. 59. 4s. 6d. net.

The aim of the author of this little book has been to present briefly to factory workers only that part of chemical science which will be of daily use and practical value where a knowledge of chemistry is either advantageous or necessary, but it is rather doubtful whether such an aim can successfully be accomplished within such narrow limits. The subjects dealt with include valence; definitions and chemical terms; chemical laws; composition, properties and construction of acids, bases and salts; hydroxides; chemical equations; mathematics; chemistry; and qualitative analysis.

H. C. B.

PERFUMES, ESSENTIAL OILS, AND FRUIT ESSENCES. By GEOFFREY MARTIN, D.Sc., Ph.D., F.I.C. London: Crosby Lockwood & Son. Pp. 138. 12s. 6d. net.

In spite of the numerous treatises giving detailed accounts of innumerable varieties of scents and essential oils there has been a need for a clear and concise account of the principal scenting substances used in practice, together with practical directions for testing them. This book may be said to supply this requirement more especially as it includes a large number of recipes including the newer synthetic perfuming substances. The book contains an interesting chapter on the analysis of essential oils and perfumes and a comprehensive index. Where fuller information is required on any particular subject reference is made to standard works.

C. H.

Annual Report on Explosives

IN the annual report of H.M. Inspectors of Explosives for the year 1920 (Cmd. 1324, 3d.) it is stated there has been a further substantial reduction in the number of factories, mainly due to the amalgamation of all the chief manufacturers into one firm, now known as Nobel Industries, Limited. Eighteen licences have been surrendered, and as four new licences have been issued the actual reduction in the number of factories is 14.

The total number of factories under continuing certificate or licence is 133, being 14 fewer than in 1919. This does not include "small firework" or "toy-firework" factories. Of these 133 factories four are in disuse. Four new factories have been licensed during the year, and 18 have become extinct. The number under continuing certificate is 33. During the year 76 amending licences for factories were granted. Many of these were issued for the purpose of consolidating existing amending licences by repealing those especially issued during the war, and incorporating with the remainder any new conditions which, although originally introduced for war purposes, might be unobjectionable in peace time. Some of these were of so complicated a nature and so extensive as to involve as much work as the granting of new licences. There have been no appeals during the year in connexion with the issue of licences.

Since the year 1885, inclusive, it has been the practice to publish a statement every five years giving the number of persons occupied in the manufacture of explosives in private factories in the United Kingdom. The following table shows the number of persons employed (maximum number) at one time during the years mentioned:—

Year.	Danger buildings.		Non-danger buildings.		Total.
1920	5,064	...	8,099	13,163
1910	4,958	...	9,632	14,590
1905	5,888	...	8,679	14,567
1900	4,828	...	6,270	11,098
1895	3,532	...	6,491	10,023
1890	3,139	...	6,681	9,820
1885	2,136	...	5,348	7,484

There have been 76 accidents in manufacture during the year, causing two deaths and injuries to 44 persons. The two fatalities occurred in the solvent recovery house of Curtis's & Harvey's factory at Tonbridge, and the accident was probably caused by friction while withdrawing trays of smokeless diamond powder from the warm stove.

A new specification and test for gunpowder barrels satisfactory to the Railway Companies was approved during the year.

The following quantities of explosives were imported, viz.: Aluminium torches, 389,989 lb.; Amorcees, 2,061 lb.; A2 Monobel, 200 lb.; Clermonite powder, No. 2, 6,440 lb.; Cooppal's powder, 2,000 lb.; Cordeau Bickford, 799 lb.; detonators, 14,788½ lb.; fuzes for shell, 968 lb.; manufactured fireworks, 300 lb.; safety fuze, 3,006 lb.; snaps for bonbon crackers, 961 lb.; tonite, 11,442 lb.; throw-downs, 300 lb.; Viking powder, No. 1, 200 lb.; Viking powder, No. 2, 200 lb.; miscellaneous samples, 5 lb. Total 433,659½ lb.

The Chemical Advisers report that the total number of explosives examined during the year amounted to 366, of which number 30 were special samples taken in connexion with accidents in mines. The number of unsatisfactory samples (75) is, considering the small number examined, very high. In previous years the majority of permitted explosives that were adversely reported on contained an excess of moisture, this year the majority of them were incorrect in other particulars. The number of new explosives submitted for examination was again very small, being only 13 samples, of which 11 passed and two were rejected. Eleven samples were examined in connexion with the testing station.

Accidents

The total number of accidents reported during the year was 438, causing 50 deaths and injuries to 455 persons. The total number of accidents is slightly above that of last year, viz., 438 against 430; but the total number of deaths is less, viz., 50 against 58, and the number of persons injured also less, viz., 455 against 502.

The following table shows the total number of accidents and of persons killed and injured during the past 10 years.

Year.	No. of accidents.		No. of persons killed.		No. of persons injured.	
1920	438	...	50	...	455
1919	430	...	58	...	502
1918	526	...	71	...	451
1917	701	...	94	...	640
1916	641	...	244	...	880
1915	485	...	70	...	472
1914	447	...	66	...	423
1913	498	...	66	...	485
1912	456	...	35	...	429
1911	515	...	56	...	548
Total	5,137	...	810	...	5,285

Over 91 per cent. of the accidents causing death or personal injury occurred in the use of explosives and under miscellaneous conditions to which the controlling provisions of the Act do not apply, and these accidents were responsible for 48 out of the 50 deaths, and 410 out of the 455 cases of injury. The total number of accidents in manufacture, keeping, and conveyance, the conditions to which the Act does apply, was 77, causing two deaths and injuries to 45 persons, and of these 77 accidents 43 were unattended by personal injury, while of the 361 accidents in use, &c., none was reported which did not cause injury. While this is no doubt partly due to the fact that an accident in use, not causing injury, would very rarely be reported, whereas the slightest case of fire or explosion which may occur in a licensed factory must be notified at once, it is only reasonable to assume that the numerous precautions adopted to minimise the risk of injury in case of accident during manufacture must be credited with a considerable share in this satisfactory result. This is borne out by a study of the accidents during the manufacture of the smaller articles, such as detonators, and also in the case of explosions in gunpowder incorporating mills.

Retirement of Professor Bedson

[FROM A CORRESPONDENT.]

By the retirement of Professor P. Philips Bedson, M.A., D.Sc., F.I.C., F.C.S., from the Chair of Chemistry at the Armstrong College, Newcastle-on-Tyne, the North has lost one of the most popular and highly esteemed men in scholastic and industrial circles. Though not of industry he was yet one of the forces which have contributed to the development of the North-East Coast. For 39 years he has held the Chair of Chemistry in the northern city with distinction, and he has retired for a well-earned rest with the close of the session.

He was born in 1853 at Manchester, and educated there at the Grammar School and Owen's College. The last two years of his education were spent at Bonn, in Germany, under Kekule. In 1878 he returned to England to take up the assistant lecturer's position at Owen's College under Sir Henry Roscoe, and in 1882 he was appointed to the Chair of Chemistry at Armstrong College, Newcastle-on-Tyne. His research work in connexion with coal dust experiments and the nature of coal dust explosions in mines brought him more than local fame in the coalfields.

It was hardly likely that the retirement of such a man would be allowed to pass without some expression of esteem from his colleagues in the chemical world. On Wednesday night representatives of the local sections of the Institute of Chemistry, the Society of Chemical Industry, the British Association of Chemists and the Newcastle Chemical Industry Club gathered in the rooms of the club under the chairmanship of Professor Henry Louis, when a presentation of a Globe Wernicke book case was made on behalf of the four organisations by Dr. J. T. Dunn. Dr. Dunn, in a few well-chosen words, described the object of the meeting, and, as an old friend and colleague, spoke of the great work of Professor Bedson for applied science in the North.

Dr. H. Peile, a former student of Professor Bedson's, also spoke, and Professor Bedson briefly replied, labouring under the stress of feeling which he could ill conceal. He thanked them for the tangible expression of their goodwill, and assured them that he would carry away from the North country nothing but the most pleasant remembrances of the pleasant time he had spent there.

Professor Bedson will live in retirement in the South after completing a short holiday.

The Chemistry of Combustion

Paper by Mr. E. V. Evans

A PAPER on this subject by Mr. E. V. Evans (South Metropolitan Gas Co.) was read at the summer meeting of the Institution of Mechanical Engineers, in London, on June 30, before the Section presided over by Dr. H. S. Hele-Shaw.

In his paper Mr. Evans appealed against the use of raw coal for the generation of heat for two specific reasons, (1) the highly complex nature of the reactions, both physical and chemical, which took place during the combustion of raw coal, and the consequent difficulty of adequately controlling combustion and obtaining the maximum conversion of energy; (2) the loss of raw material required for the promotion of chemical industries which resulted from the combustion of raw coal. The combustion of carbon was commonly represented as a 'simple bimolecular reaction, $C + O_2 = CO_2$, reversible only at very high temperatures. Further, it was well known that carbon dioxide would react with incandescent carbon to produce carbon monoxide, $CO_2 + C = 2CO$, which was again a reversible reaction.

The belief was very widely held that when a limited volume of air was passed through a bed of incandescent carbon these two reactions represented the mechanism of the production of carbon monoxide. A large amount of research work had been carried out to determine the chemical equilibria of these reactions, but as the combustion of carbon was of a more complicated nature than the equations represented, the information so far obtained had been of limited value to the designer of gas producers. It was now generally accepted that the primary product of the oxidation of carbon was a complex of carbon and oxygen which had a transitory existence. This complex decomposed into a mixture of carbon monoxide and carbon dioxide in proportions which depended upon the temperatures at which decomposition took place.

A Fundamental Point

The fundamental point of this hypothesis, which was confirmed by research, was that some carbon monoxide was formed directly without the intervention of carbon dioxide, and that a third reaction had to be added to the two so-called producer-gas reactions. It would be realised that in producer gas generators this directly obtained carbon monoxide produced in the lowest layers of the fuel bed was surrounded by oxygen molecules which had not yet succeeded in reaching the carbon surface, and was, therefore, liable to rapid oxidation to carbon dioxide before it travelled very far on its passage through the fuel bed. If the fuel bed were more than a few inches deep and at a sufficiently high temperature, this carbon dioxide would be again partially converted to carbon monoxide according to the second of the reactions stated. The product would then be found as a constituent of the producer gas, or would burn with its characteristic flame, according to the conditions of air supply to the fire. The combustion of hydrogen was a trimolecular reaction, reversible at very high temperatures, but the reaction was a simple one, and did not call for special mention.

The combustion of the simpler gaseous hydrocarbons introduced reactions which were more complex than those hitherto mentioned. Although combination with oxygen at high temperatures appeared to take place in a simple manner, this was not really the case. It had been shown that when combustion proceeded at low temperatures in the presence of a catalyst, many intermediate products were formed before the final product, carbon dioxide and water vapour, emerged. Thus, during the slow combustion at 400°C. of the simple hydrocarbon ethane, products such as ethyl alcohol, glycol, acetaldehyde, formaldehyde and formic acid were formed before the final production of carbon dioxide and water vapour. Oxygen entered the molecule at several definite stages, involving the successive formation of the products mentioned. Therefore, the apparent simplicity of the reactions involved in the combustion of simple gaseous hydrocarbons was due to the high velocity of the reactions at high temperatures.

With regard to the combustion of the more complex hydrocarbon molecules it was easy to imagine that as the hydrocarbon molecules increased in their complexity, so the number and variety of intermediate stages in the oxidation process also increased, and that a culminating point would be reached

when the formation of intermediate products could not be masked by the high velocity of the reaction. The result was a tendency to incomplete combustion.

Side Reactions in Raw-coal Combustion

In the case of the combustion of raw coal the complexity of the reactions which took place during oxidation was augmented by a number of side reactions of a physical as well as of a chemical nature. The process was preceded and accompanied by the decomposition of the coal substance. Long before the ignition temperature of the coal was reached, some of the coal substance melted or decomposed into less complex bodies, and frequently with the evolution of gas, whilst the newly-formed degradation products might also melt and further decompose. If the boiling point of any of these liquids were lower than the temperature of decomposition, distillation would immediately take place, and if the vapours came into contact with a cooler zone, condensation and smoke formation would result. The gas might, however, become heated in the course of its passage so that ignition would take place, but it was impossible to predict the sequence of events, as it was impossible to control the conditions to which the products of combustion would be subjected. There was no doubt but that the coal substance underwent extensive decomposition, either in the solid or liquid form, prior to distillation. Whether the distillation products ignited or escaped as smoke would appear to depend upon the relation between the ignition temperature and the boiling point. When there was a large temperature difference there was obviously greater opportunity for the gas to be carried away into a cooler zone before combustion occurred.

Another factor to be considered in connexion with the combustion of smoke was the fact that it was usually evolved in a zone already highly charged with products of combustion from the fire below. For this reason a suitable excess of air must be provided, and if air were admitted to the combustion chamber above the level of the fire it must be preheated to avoid cooling the products below the ignition temperature.

The combustion of oil fuel and powdered coal could be controlled in the same way as that of gaseous fuel, though perhaps not to the same extent. Finally, the author again referred to the appalling waste of inorganic and organic chemical products brought about by the combustion of raw coal.

Discussion

The CHAIRMAN welcomed the paper as being one of the steps that must be taken between the chemists and the physicists to make use of modern development and knowledge.

Mr. P. V. VERNON, referring to pulverised fuel fired into a rotary kiln, asked if it were not true that the chemical reactions which took place when burning powdered coal under these conditions were not simpler and more rapid than the chemical reactions which took place when burning coal in a bed, as in an ordinary furnace.

Mr. CABINA mentioned the case of a vertical boiler using ordinary coal, in which the combustion was good. The gas was perfectly clear, and there was no smoke. As soon as a superheater was attached, however, dense smoke was emitted, and he would like some information on that.

Sir GERARD MUNTZ said he had carried out experiments with oil fuel with interesting results. Using air pressure with ordinary burners a very good fire was obtained. Steam was then introduced instead of air, and apparently a better result was obtained. The heat was intense, but in the course of about 24 hours the furnace stopped, and all the gases and flames came out of the furnace instead of going up the stack. On investigation, it was found that the whole of the down-take flues had melted, and were practically a solid block of masonry. This was due to the fact that there were associations and re-associations of the fuel in the course of burning, and the combustion was taking place in the flue at a greater heat than that of the furnace.

Mr. MAX LAWRENCE said the point that had appealed to him was that in order to get all the heat from a fuel it should be burned completely, and in order to do that it must be kept at the necessary temperature until it was all burned. The greatest advance he had seen lately in connexion with furnaces was to burn the fuel completely before admitting it into the furnace, and using some of the waste gases. Some of that heat ought to be utilised before it was turned into the chimney. Heating

the incoming air and taking that heat from the waste gases, so again raising the temperature in the furnace and completely burning the fuel before taking any heat from it, was one of the greatest advances he had seen. When trying to do this in 1910 he had experienced difficulty in getting a suitable fire-brick to stand the enormous temperature. The furnace worked perfectly, but it kept melting, and a compromise had to be made—the full temperature of the fuel not being developed.

Mechanical Difficulties

Mr. H. M. RIDGE referred to the mechanical difficulties of obtaining complete combustion of raw coal. In a large furnace installation, with a whole range of gas producers, it was necessary periodically to burn out the producer gas flues to remove the intermediate products, which were generally wasted. He had tried to obtain complete combustion of coal available in different districts, and had treated the coal in three stages. The three stages were the driving off of the volatiles, the gasification of the coke, and the admission of a sufficient quantity of preheated air to burn the CO_2 and hydrogen to water. The result of separating the operation into these three phases was that waste gases were being obtained which for the week's average gave over 17 per cent. CO_2 , and that had been done with absolute absence of soot deposition or other troubles. With regard to burning coal outside the furnace, that, of course, was the ideal condition.

Mr. LOUGHAN PENDRED asked whether we ought to be able to burn oil without smoke. Stations now using oil were producing a considerable amount of smoke, which was of a rather sticky nature.

Mr. MARSHALL (Scarab Oil-Burning Co.) said his company had not had time to make exhaustive tests, owing to the tremendous hurry with which oil burners had been installed lately. There should be a pale grey smoke emitted. If that was not emitted the users of oil were liable to have too much air, which would reduce the efficiency. We were in the early stages at present with regard to oil burning. There was no doubt that considerable improvement could be made in furnace arrangements in order to get the highest efficiency. He was forced to the opinion that with boiler work it was better to sacrifice the small efficiency obtained by preheating the air for the sake of getting the longer life of the fire bricks.

The CHAIRMAN asked whether it was possible to have more air getting into the furnace than was required to effect combustion.

Mr. EVANS said it was very easy to get too much air when using powdered fuel. He believed the ideal would be to design a furnace in which there was an adequate preheating of the air in oil burners. With adequately preheated air, preheated in the right quantity, it was possible, he imagined—provided the settings could stand the temperatures that would be attained—to get a perfectly complete combustion with oil, without a large excess of air.

Future of Rubber

Drastic Reduction in Output

THE secretary of the Rubber Growers' Association, under date July 5, has issued the following circular to members and the Press: "With reference to the circular dated June 7, I have to advise you that at a meeting of my council, held on the 4th inst., the following resolutions were carried: (1) That the revised draft scheme for a 'Rubber Producers' Corporation,' submitted to this meeting, be adopted as the proposal of this council, and that the output control committee be empowered to take steps with all speed to secure the support necessary to make the scheme effective, with discretion to make such amendments in the scheme as may be found necessary. (2) That, in view of the imperative necessity for an immediate reduction of output by at least 50 per cent., and having regard to the delay which will necessarily ensue before the scheme for a 'Rubber Producers' Corporation' can become operative, the Council recommend all producers of plantation rubber, who have not already done so, to take the necessary steps to bring such reduction of output into effect immediately.

"In regard to the first resolution, a memorandum is being drawn up to accompany the scheme, and the documents will be issued with the least possible delay."

British Petroleum Policy

No General Intention to Exclude Foreigners

IN a memorandum on the petroleum situation, enclosed in a despatch to the British Ambassador at Washington, Lord Curzon explains British policy in relation to petroleum supplies. He states:—

Statements have frequently appeared in the foreign Press during the past year to the effect that his Majesty's Government are co-operating with British commercial interests to secure an undue share of the petroleum resources of the world, and, while they are entirely without foundation, they may through constant repetition have obtained some credence.

Great Britain is, next to the United States and (in normal times) Russia, the largest consumer of oil in the world. Over 90 per cent. of her Navy is oil-fired (as compared with 45 per cent. before the war), as is a rapidly increasing proportion of her merchant marine. Her present home resources consist of one well giving a daily production of 1 ton, and Scottish shale fields which yield about 165,000 tons of oil products annually. In 1920 Great Britain imported about 3,368,600 tons of oil (motor spirit, kerosene, fuel oil, lubricants, &c.) of a total value of £67,000,000. Of this, 61 per cent. in quantity and 68 per cent. in value came from the United States, 37 per cent. in quantity and 30 per cent. in value from other foreign countries, and 2 per cent. in quantity and 2 per cent. in value from British Possessions. During the war the annual imports of petroleum rose as high as 5,160,000 tons. The figures which have been quoted indicate that although the consumption of Great Britain per head is only about one-sixth of that in the United States, her requirements are, nevertheless, very large, and are at present met almost wholly from foreign countries at an extremely high cost.

Particulars are given of production within the Empire, showing that the annual production in Canada is about 34,000 tons, which meets only a small proportion of the Dominion's requirements, in India about 1,200,000 tons, which is insufficient to meet the country's needs, in Egypt 155,000 tons, and in Sarawak 150,000 tons. The figures, Lord Curzon states, show the extremely small oil production of the British Empire and the absence of any general policy of exclusion of foreigners. In the vast areas of territory where there are no restrictions no foreign country has taken the opportunity of exploring for oil except in the case of British North Borneo, whereas in Canada and Trinidad, where restrictions are in force, foreign capital has for many years past been actively at work both on its own account and by way of participation in British companies. It can therefore hardly be contended that the restrictions have imposed any serious disability on foreign enterprise.

Among the criticisms levelled against this country, the memorandum states, is that of having secured a monopoly in Persia. It should hardly be necessary to say that the rights of the Anglo-Persian Oil Co. in Persia have no connexion whatever with the British Government holding in the company, but are mainly derived from a concession which was obtained through the personal enterprise of Mr. W. K. D'Arcy in 1901, and for which it was equally open to any other individual, British or foreign, to apply. It was only after heavy expenditure and much discouragement that success was achieved, to the great advantage of Persia, and the suggestion that British Governmental influence was used to force a monopoly on an unwilling country can only be made through complete ignorance of the facts. The British Government did not acquire its present holding in the Anglo-Persian Co. for 13 years after the concession was obtained by Mr. D'Arcy, and it does not interfere with the company's commercial policy in any way.

Benn Brothers Staff Outing

THE staff of Benn Brothers, Ltd., visited Westerham on July 2, on the occasion of the first summer outing organised by Benn Brothers' Social Circle. The party, which numbered upwards of 80, travelled by train to Oxted and rambled over the common and through the woods to Westerham, where luncheon was served. On returning to Oxted the party were entertained to tea at Blunt House by Mr. and Mrs. E. J. P. Benn, and games followed. Sir John Benn (Chairman of the Directors), Lady Benn and other directors were present.

Liquid and Powdered Fuels

Their Applications in Industry

At the Summer Meeting of the Institution of Mechanical Engineers on July 1, one of the sections presided over by Mr. L. Pendred dealt with the above subject.

Dr. W. R. Ormandy presented a paper, in which he pointed out that the main advantage in the use of liquid fuels was undoubtedly due to their high heat value. For rough and ready purposes one might regard oil fuel as having a heat value of 18,000 B.Th.U. per lb., as compared with 12,000 B.Th.U. for coal, and to this must be added the ease with which a liquid fuel could be handled, as compared with a solid fuel. Liquid fuel could be used in a large number of industrial operations, but there were many operations to which it was not applicable, such as the blast furnace, the cupola, large pot furnaces for melting glass, &c.

Ordinary steam boilers could readily be adapted to consume oil, and in works where the fuel costs formed a very small proportion of the total costs, probably oil would continue to be used. The value of oil as a fuel could not be reckoned in terms of its added heat value as compared with coal. It was cheaper to handle in the first place, and a greater number of heat units could be stored in a given space. It could be burned more efficiently than coal, in that it was easier to regulate the ratio of air to fuel, and to obtain a much better analysis in the effluent gases. A further advantage lay in the much smaller amount of labour employed in looking after furnaces when oil was used.

For marine use, oil offered great advantages, the operation of coaling being replaced by the cleanly and much more rapid operation of pumping in liquid oil. The many subsidiary advantages in the use of oil fuels for marine steam-raising would undoubtedly further the adoption of oil, unless the price was raised sufficiently to counterbalance the advantages accompanying its use.

As oil was used much more efficiently in internal combustion engines of the Diesel and semi-Diesel type, it was desirable that only such oils should be burnt for fuel as were too heavy or too impure to be burnt in internal combustion engines. The ordinary steam-driven engine seldom gave more than 10 per cent. of the heat value of the fuel in the form of energy at the flywheel, whereas the internal combustion engine gave anything from 20 to 35 per cent. Tar oils produced on the distillation of coal were now largely used as fuel oils, both for burning under boilers, for furnace heat, and in a lesser degree in internal combustion engines. Efforts were being made in the direction of improving the Diesel and semi-Diesel engine so that it would consume a wider range of fuels than had hitherto been possible.

Powdered Fuels

With regard to powdered fuels, powdered coal had long been used in the rotary furnace method for the manufacture of Portland cement, and in America considerable advances had been made in the direction of using powdered coal-dust as a fuel for steam-raising. It was necessary that the coal be dried to a few per cent. of water, and that it be ground to a considerable degree of fineness, so that only a few per cent. were left on a 200-mesh sieve. The technique of such drying and grinding had been greatly advanced, and the cost brought down to some of the order of 5s. per ton, but the drawback lay in the bulkiness of the powdered fuel and the necessity for making a good airtight job of the store tanks and connecting mains, and having regard to the cost of plant and installation, it was doubtful whether the process offered great saving. Dried and powdered peat had been used with great success in Sweden, and, having regard to the huge deposits of peat in Scotland and Ireland, close attention should be paid to the progress being made in this direction.

As to the use of a mixture of powdered solid fuels with liquid oil, all the advantages of oil fuels, applied equally to these mixtures, but the settlement of the solid fuel out of the liquid was the question. It had been proved that coaldust ground by commercial apparatus so that it all passed through a 100-mesh sieve did not settle into a firm mass out of heavy fuel oil in several days. It was quite a feasible proposition to transport oil-coaldust mechanical mixtures by tank wagons, and to be sure of the discharge of such wagons even after many days standing, if they were provided with a perforated pipe

through which compressed air or gas could be blown. Very slight agitation by means of a gas was sufficient to keep coaldust and fuel oil in intimate admixture.

Modern development in the direction of the recovery of fine coal from low-grade deposits by modification of the Elmore flotation process pointed in the right direction. Such processes might enable good grade fuel to be obtained from hitherto valueless deposits, and the fact that the recovered product was in the finely divided form might prove an advantage rather than otherwise. It was well known that finely divided powders could be stabilised in suspension in oil, but it was doubtful whether the benefit derived from such stabilised suspensions would be worth the added cost.

A discussion followed in which Sir Henry Fowler, Messrs. P. V. Vernon, M. R. Lawrence, P. W. Griffin, R. Bruce, F. T. Evans, A. Forster and L. Pendred took part.

Internal Combustion Engines

Mr. Harold Moore then read a paper on "Fuel Oils for Internal Combustion Engines," in which the author said the types of liquid fuel available for use in heavy oil engines were very limited. Though liquid fuels could be obtained from a variety of sources, in many cases their preparation was not an economical proposition, or else the processes involved were not sufficiently developed to allow of their application on a commercial scale at the present time. The main types of liquid fuel were petroleum, shale oil, and the liquid products obtained by the destructive distillation of coal, lignite, peat and wood. A further source was the manufacture of alcohol, but there was very little likelihood of this product entering the market as a fuel for heavy oil engines for many years to come. Whatever alcohol might be prepared in the near future would almost certainly be marketed as a motor spirit.

After reviewing the present position of the existing sources of supply of fuel for heavy oil engines, the author said it seemed that there were only two main sources of liquid fuel before us. The first was petroleum, and the second coal tar. The two important fuels available for use in heavy oil engines in this country were imported petroleum and home-produced raw tar, the output of raw tar in the United Kingdom being only some 2 per cent. of the world's petroleum production, which in 1920 was 90,000,000 tons. Only a small proportion of the output of petroleum was available for use in heavy oil engines, the lighter fractions being required for other purposes, all these products left residua which were available for burning. Hitherto only the lighter varieties of residua had been utilised in internal combustion engines, the majority of heavy oil engines in use at the present time being incapable of utilising extremely heavy asphaltic oils. With the increased demand for fuel for heavy oil engines we might see something approaching to the boom which took place in the petrol market during the ten years following 1909. If such should be the case the heavier distillates and lighter residua utilised in the past would be insufficient to meet the demand, unless some unexpected additional source of crude petroleum be discovered.

Hitherto, the only coal tar product utilised in heavy oil engines in any quantity had been the creosote oil fraction; but the production of this oil was only about 20 per cent. on the weight of tar, and the timber creosoting industry also made large demands for it. The residue of coal tar distillation was pitch, and it appeared very probable to the author that internal combustion engines could be developed in the near future to burn a fuel of the character of pitch, but there was no doubt that engines could be built which would give reliable working on some of the lighter varieties of raw tar, such as the tar yielded by vertical gas retorts and by certain of the coke oven plants.

The most important move necessary in the future was the development of heavy oil engines which would use heavy fuel. This would necessitate research in the improvement of existing spraying or pulverising devices, perhaps increase of compression, and probably a decrease in the speed of the engine. Such engines, would, of course, encroach upon the supplies of the furnace oil user, but as he was not in a position to utilise fuel with the same efficiency as the heavy oil engine user, he must turn to the solid fuels, of which much larger supplies were now available.

A discussion followed in which Dr. Ormandy and Messrs. P. W. Petter, L. Pendred, and A. Carmichael took part.

Low Temperature Carbonisation

Paper by Professor Bone

MR. W. H. PATCHELL, presided over a section at the Summer Meeting of the Institution of Mechanical Engineers on Thursday, June 30, when a paper by Professor William A. Bone, F.R.S., of the Imperial College of Science and Technology, London, on the above subject, was read and discussed.

The paper, which in the absence of Professor Bone, through illness, was presented by Mr. Eric Sinkinsen, of Sheffield University, dealt with the importance of developing the low temperature carbonisation of coal, the commercial success of which would depend on its ability to produce a smokeless solid fuel, suitable for domestic consumption, and capable of being economically transported by rail and delivered to houses in all large centres of population, at a price which would compare not unfavourably with that of raw coal. In pre-war days town gas was rapidly displacing raw coal as a domestic fuel, but with gas therms costing about six times as much as coal therms, it seemed as though gas was in danger of becoming a luxury for the comparatively well-to-do. So far as domestic consumption was concerned, gas would still remain an economical fuel for cooking purposes, and for apartments requiring occasional heating, but for the ordinary living rooms of a house the open fire-place would probably long continue to be the most healthy and economical heating appliance. Hence, in the author's opinion it was chiefly to some such smokeless "semi-coke" as was produced by the low-temperature carbonisation of a suitable bituminous coal that we must look for the ultimate abatement of the domestic part of the smoke nuisance.

A solution of the domestic heating problem would bring in its wake a valuable addition to the nation's oil fuel and motor spirit resources. Laboratory tests made upon typical British bituminous coals had shown that on carbonisation at from 550°C. to 600°C. they might be expected to yield from 10 to 15 per cent. of their weight of motor spirit and fuel oil, as well as between 3,000 and 4,000 cubic ft. per ton of a rich gas. The oils were chiefly hydro-benzinoid in character, but much further research upon them was needed before their composition could be stated in detail.

Dr. Lander's Views

Dr. CECIL LANDER, who spoke on behalf of Sir George Beilby, referred to the work carried out at the Fuel Research Station at Greenwich. A great deal of time, he said, had been spent on low-temperature carbonisation there. The bulk of the work had been directed to finding for as many suitable coals as possible accurate thermal and weight balance sheets, and this had been effected by carrying out carbonisation on a scale quite comparable with what one would expect might be a future works lay-out. There were eight horizontal steel retorts about 6 ft. long by 3 ft. by 10 in. Up to the present some 120 coals had been tested. Whilst this was going on a laboratory assaying method had been developed, by which a small portion of 20 to 25 grammes could be subjected to carbonisation and the results accurately obtained. The results from the laboratory assay had thrown valuable light on the large scale operations. When the coal was subjected to low temperature carbonisation, first there was a very rapid evolution of gas, which continued for a time until a peak was reached, and then there was a rapid fall. The standard method adopted in getting out the large scale work had been to stop carbonisation when a certain amount of gas had been given off, as it was no use going beyond that point. The method used at the Fuel Research Station was to fill the coal to a definite depth into horizontal trays, which were put into the retorts, and it had been found that the time of carbonisation was very greatly reduced by sub-dividing the trays into sections. He submitted a number of samples of the material produced at the station, made at about 600°C., showing the firmness of the briquettes; it was a very transportable fuel, fairly hard, and did not fall to powder.

Dr. R. LESSING said he was sorry to say that we were now not very much nearer a solution of the problem of treating coal at low temperatures than we were 16 or 18 years ago, and the main reason for this state of affairs was that we knew very little about coal. Our ignorance on this most important material was indescribable, and the subject required the attention of more investigators. He was glad to see that at

the Fuel Research Station they were tackling the problem from the scientific point of view, regardless of its commercial application in the first instance. He himself had also devised a method of assaying. The results were the same as those obtained at the Fuel Research Station, and the results on the small scale test, when translated, were confirmed by the large scale work.

Mr. SARGANT, for Sir Robert Hadfield, said that after seeing the low temperature carbonisation plant at Barugh, near Barnsley, he had come away with the impression that it was a fine plant. The method employed at Barnsley differed from the method adopted in the Fuel Research Station. The coal was carbonised in large horizontal ovens, and there was an ingenious way of getting rid of the swelling of the coal. There were two perforated plates suspended vertically in the oven, which broke up the swelling coke. When the coke was dropped the plates fell apart and the coke fell into waste heat boilers.

Mr. G. M. GILL said that as a gas engineer he had never looked upon low temperature carbonisation very hopefully because as a carbonising proposition it had always appeared to him a very poor one.

Mr. F. R. DOLBY said that the original method of carbonisation adopted by the Coalite Company was by vertical cast-iron retorts. From the remarks of Dr. Lander it appeared that the present process was rather to carbonise in thin layers.

Mr. BELTON said that up to now low temperature carbonisation was nothing like a commercial proposition, and he did not feel inclined to shut up his works because low temperature coke was coming on to the market to displace the use of gas for heating.

Mr. SINKINSEN, replying to the discussion, objected to Dr. Lessing's remark that our ignorance in regard to coal was indescribable. There were difficulties in regard to the time taken in carbonisation, carbonising in thin layers, the swelling of certain coals, and the difficulty of getting them out of the retorts. These were initial difficulties, and chiefly matters of mechanical design rather than chemical. With regard to costs, Professor Bone had instructed him to emphasize that a coal therm cost 2½d. and a gas therm 18d., and if low temperature coke could be turned out it should cost 3d. per therm. What was really wanted was something which could be burned in an open grate, without, at the same time, involving the waste of large quantities of ammonium sulphate, oil, &c.

Explosion at Powder Works

Result of Adjourned Inquest

THE cause of the explosion at the powder works of Curtis's & Harvey at Pontneathvaughan on June 17, whereby John Jones, millwright, and David Jones, millwright's helper, lost their lives, still remains a mystery, and at the adjourned inquest on June 29 the jury found that the death of the men was due to shock and the explosion to an accident. The men, both non-smokers, were engaged in the press-house on the day of the accident. The manager, Mr. Moses, visited the house only an hour before the explosion, and John Jones was then oiling the press. Owing to depression in trade the works had been stopped since April 28, which was the last time the machinery was oiled. There were 300 lb. of powder there at the time of the explosion, which wrecked and set the press-house on fire.

The manager told the jury that the only possible explanation of the explosion was that the plates of the press, which were faced with copper on cast-iron, came into violent contact with each other and caused friction and a spark. Thomas W. Moses, works foreman, answering Colonel F. Thomas, Home Office Inspector, said that after the explosion he found the two plates of the press close together, whereas they should have been apart. A steel spring was usually kept to hold the plates apart when not at work. The top lever was hard set, and the witness assumed that the accident happened through the top ram having been driven home too hard on the lower plate when the machine was oiled. Mr. F. A. Green, of London, consulting engineer to Messrs. Curtis's & Harvey, said that after the explosion he found the bottom plate of the press down and the floating plate also at the bottom of the stroke.

The Future of Gretna

Low Temperature Carbonisation Possibilities

IN a letter to the *Glasgow Herald* a correspondent enters a strong plea against the scrapping of the large plants at Gretna. These factories, he says, "are pre-eminently adapted for the chemical industries, and if either the Government or a combination of chemical manufacturers would take over the works, and make the necessary alterations to carry on the manufacture of the necessary chemicals required for industrial purposes on a large scale, we might even be able to compete with Germany in foreign as well as home markets. The bases of most of these chemicals are the by-products from coal, and we have been hearing from time to time of experiments having been carried out with the low temperature distillation of coal which produces a high-class smokeless fuel and at the same time gives a supply of products which can be worked up to produce a large variety of chemicals."

"Gretna, being situated in the Borders, it would be possible to send coal from the Cumberland and Newcastle districts north, and from East and West districts south, to be carbonised at Gretna. When the by-products are extracted the coal would then be re-despatched as smokeless fuel throughout the whole country."

"It may be argued that the cost of freight would be excessive, but this would not be a very serious consideration seeing that in pre-war days the Germans could buy coal from us, ship it to their works, extract the by-products, use the smokeless fuel, and re-export the chemicals to us at such a profit as to be able to put the chemical industry on a very firm footing in Germany. It should therefore be possible for us to make the by-products almost pay for the whole process, and the smokeless fuel would then be the real by-product, which could be sold at a reasonable price."

"The gas evolved in the process which could not be turned to account in the works could be usefully employed in the manufacture of steel, and by a suitable combination of industries nothing would be lost, so that the full benefit would accrue to the country. It is to be hoped, therefore, that some such scheme will be taken up either by the Government or by some combination of chemical manufacturers, which will ensure that Gretna is not demolished, but turned into an active industrial area which would cast its beneficial effects over the whole country, especially if we could depend upon an adequate supply of smokeless fuel."

Business Announcements

JENSEN, LAWSON & CO., 17, Monument Street, E.C.3, announce that Mr. H. Gelpke ceased to be a partner in the firm on and from the 30th June, on expiry of partnership agreement. The business will be continued under the same style, as Jensen, Lawson & Co. by the two remaining partners, Mr. R. P. Jensen and Mr. A. F. Lawson, who by agreement with the outgoing partner have taken over the assets and liabilities and will execute any unfulfilled contracts.

MR. H. GELPKE, of 20, Chatsworth Road, Croydon, announces that on June 30 last, on expiry of his partnership agreement with Messrs. R. P. Jensen and A. F. Lawson, he ceased to be a member of the firm of Jensen, Lawson & Co. By mutual agreement the assets, liabilities and unfulfilled contracts of the firm have been taken over by his previous partners. From now onward he will do business in his own name and will continue to specialise in coal tar products and chemicals. All communications should be sent to the above address until further notice.

MESSRS. SUTCLIFFE BROTHERS of Globe Works, Godley, near Manchester, announce that they have converted the business of boiler and pipe covering manufacturers and contractors, established in 1869, into a private limited liability company as from July 1, 1921. The personnel of the management for the registered company will continue as before:—Mr. J. Walton Sutcliffe, late proprietor, and Mr. Reginald Bryce, late manager, now becoming sole directors. The name of the company, however, will now be Sutcliffe Brothers & Bryce, Ltd., with the principal works and head office, as in the past, at Globe Works, Godley, Hyde, Manchester. The firm's specialities are:—85 per cent. magnesia composition, slag wool and steel sheeting, asbestos composition, fossil meal composition, hair felt, asbestos rope, cork coverings for cold storage plant, &c.

Fuel Research Work

Recent Developments at East Greenwich

ON Monday, at the invitation of Sir George Beilby, Director of Fuel Research, a party of journalists, including a representative of THE CHEMICAL AGE, paid a visit to H.M. Fuel Research Station at East Greenwich. As will have been gathered from the published reports of the Fuel Research Board, the station is essentially a scientific laboratory for the study of fuel problems, but it differs from an ordinary laboratory in that anything from 20 to 30 tons of coal can be dealt with in the course of a day. Much time has been devoted to the design of efficient apparatus for carbonisation at low temperatures, and one of the latest developments is the adoption of continuous instead of intermittent operation. The plant for this purpose, which is at present in course of erection, consists of a revolving steel tray 16 ft. in diameter, divided into compartments into which the powdered coal is fed by means of hoppers. The coal will be carbonised as the tray rotates, and on completion of the revolution—at the end of three hours—the semi-coke is automatically discharged, its place being taken by a fresh supply of raw coal. The tray is thus always full of coal in different stages of carbonisation.

Experiments are still being carried out on seaweed and peat. The results of investigations on air-dried peat (25 per cent. moisture) show a yield per ton of 13,700 cubic ft. of gas having a calorific power of 340 B.Th.U., 20 galls. of tar oils, and 25 lb. of sulphate of ammonia.

Major & Co.: Increasing Use of Oil Fuel

PRESIDING at the general meeting of Major & Co., Ltd., held at Hull on June 30, Mr. J. L. Major said the times had been very trying and they had not yet escaped the break in prices. The stagnation of trade was not entirely due to the coal strike, though, of course, it had been aggravated by it. As far as Major & Co., Ltd., was concerned, they had been carrying on all through the strike, as they had considerable stocks of coal, and as these became exhausted they used fuel oil, of which they were producers. They had, moreover, been selling considerable quantities of fuel oil during the strike.

Of their subsidiary companies, Tarslag, Ltd., was at present the most successful.

With regard to the future, Mr. Major said the outlook now that the coal strike was settled was a little more hopeful, but he, for one, did not anticipate any boom in trade. Until there was an improvement in the foreign exchange, until taxation became less onerous, until the purchasing power of the purchaser, both at home and abroad, was increased, and until we could be assured of settled conditions of labour, he did not think we could look forward to any real return to prosperity.

Bankrupt's Discharge Suspended

THE affairs of Felice Bonaventura & Co., general merchants and importers, 24, Great Tower Street, E.C., were again before the London Bankruptcy Court on June 29, on an application for an order of discharge by Mr. Edwin Harrison, a partner in the firm. A similar application was recently made by Mr. F. L. Bonaventura, senior partner (See THE CHEMICAL AGE, June 4, p. 650), and it was then stated that the firm had traded in chemicals, drugs and general merchandise.

Mr. W. P. Bowyer, Senior Official Receiver, reported that the applicant, a qualified chemist, became a partner in the firm in July, 1916, when they took premises at Stratford for the manufacture of lanoline. They traded there under the style of the Hab Chemical Co., but the branch was unsuccessful and was closed at the end of 1918. The firm's failure was attributed to losses on produce contracts, and general depression in trade. The liabilities amounted to £16,250 and no dividend could be paid.

Mr. E. W. Hansell, for the applicant, pointed out that his client had taken no part in the financial side of the business.

The Registrar suspended the discharge for two years on the grounds that the assets were less than 10s. in the £, and that the partners had traded after knowledge of insolvency.

Tarapaca Nitrate Company

Factors Affecting Sales

At the fourteenth annual general meeting of the Tarapaca & Tocopilla Nitrate Co., Ltd., held on Tuesday at Winchester House, E.C., Sir Robert Harvey, who presided, said that during the past year they had actually shipped and taken profit on 643,260 quintals of nitrate sold at prices varying from 9s. to 15s. f.o.b. The total profits and receipts from transfer fees and income on investments amounted to £90,087, after deducting £10,000 for the stoppage and re-opening expenses of oficina "Virginia." Moreover, they had since collected the profit, amounting to over £100,000, on the nitrate sold for this year's delivery, at prices ranging from 15s. 6d. to 17s. 3d. per quintal f.o.b., the benefits of which would be shown in the accounts for the current year. The directors now proposed to distribute a dividend of 10 per cent., less income tax, absorbing £14,000, and to carry forward the balance of £62,309. They had been guided in this conservative recommendation by two important facts. The first was the purchase of the property known as "San Andres." These grounds contained large quantities of good grade caliche. They were situated about three kilometres from the "Santa Fe" maquina, to which the raw material could economically be transported and treated. The importance of this acquisition could not be over-estimated, as it increased the life of their business by many years.

With regard to the present condition and the future prospects of the industry, Sir Robert Harvey said the nitrate business had always been subject to periods of inflation and depression, but in his experience of nearly 50 years he did not remember one quite so serious. Generally speaking, the unsettled state of the world's markets during the last few months, exchange disparities, universal lack of funds, restriction of the usual credit facilities and high prices, affected the sales of nitrate, not only in Europe, but in America and Japan. The unsold stocks held by the dealers, in the opinion of many, would suffice to meet a considerable part of the demands for next season. This meant that the shipments of nitrate for the next 12 months would be on a much smaller scale than in past years. Negotiations were now proceeding between the chief holders of stocks, who had formed themselves into a pool, and the association, with a view to protect themselves, and to make possible the shipment of new nitrate. In the meantime, this company, in common with many other producers, had closed its oficinas, and unless the present position materially changed manufacturing operations were not likely to be resumed this year.

Catalogues Received

WE have received from the No-val Engineering Co., Ltd., a booklet describing their "Rovalless" pumps, which they state are suitable for use in dye, soap, chemical and gas works. The pumps are positive but valveless and, owing to the two drums being of equal diameter, the periphery speeds are equal.

Minrol, Ltd., of 47, Produce Exchange Buildings, 8, Victoria Street, Liverpool, send us a brochure on the "Minrol" lubricating products. These products, the firm state, are made by a process which transforms a specially selected pure oil into a firm homogeneous, resilient lubricant, with an exceptionally high melting point.

The Foster pyrometers are the subject of a folder issued by the Foster Instrument Co., of Letchworth, Herts. The Company specialise in the manufacture of pyrometers for all purposes and the folder illustrates portions of the works, thermo-couples, and a typical recorder. Branch depots of the Company are situated at Queen's College, Paradise Street, Birmingham, and at 9, Newton Road, Leeds.

In consequence of the extension of subsidiary industries the Broken Hill Proprietary Company has undertaken important extensions of plant, including the provision of a sulphuric acid plant for the supply of sulphate of ammonia.

According to statistics received from Paris the total production of Alsatian potash during 1920 reached 1,061,197 tons. Of this amount 450,000 tons were sold in France, 327,000 tons were exported to the United States, 117,000 tons to Belgium, and 92,000 tons to the United Kingdom.

Manchester Chemical Trade

Sir S. W. Royse & Co.'s Monthly Report

DURING the month trade has continued at a low level as a result of the labour troubles, and, in the absence of demand, prices, with a few exceptions, have eased. There is reason to hope for an improvement soon, seeing that a settlement has now been made in the cotton trade and there are also indications of an early resumption of work in the collieries. Sulphate of copper has been in small request for both home and export account, and the price is easier in sympathy with the metal. Although the official returns for January to May last show an increase in exports of 6,746 tons over those of the corresponding period of 1920, the home demand for agricultural purposes has fallen away considerably. Green copperas continues in short supply, but is sufficient to meet current requirements. Stocks of acetic acid and acetate of lime are ample and lower offers have been accepted for definite business. There has been little call for acetates of soda and lead, or nitrate of lead. Carbonate and caustic potash have been in only moderate demand and prices have eased. Montreal potashes have been offered freely from recent arrivals, but concessions in price have to be made to effect sales. Yellow prussiate of potash has been in fair request and has remained firm. Some good export enquiries for prussiate of soda have been on the market, but have not materialised. White powdered arsenic has been in poor request. Stocks of tartaric acid are only moderate; demand has been well maintained and prices are firm. There has also been a steady call for cream of tartar, with the continuance of the hot weather.

The demand for citric acid has fallen away somewhat, but the price is unchanged. Secondhand parcels of bichromates continue to be pressed for sale, but consumption has been affected by the labour troubles. Oxalic acid has been moving more freely but stocks are ample. Borax and boric acid have been in fair request; phosphate of soda has been dull. Makers of alum and sulphate of alumina have reduced their prices, but this has not stimulated business. Lump sal ammoniac is still freely offered, but muriate of ammonia has been moving better for export, and lower prices have been accepted for some markets. Bleaching powder has remained quiet and a considerable reduction in price has been made for deliveries during the second half of the year. Caustic soda and ammonia alkali have been in fair demand. Chlorates of potash and soda are very dull. There is no improvement in the position of tar products and supplies are becoming scarcer, through want of fuel and raw material. Solvent naphtha is somewhat firmer in value, owing to reduced production. Benzoles and toluoles are offered sparingly; creosote has remained quiet. Crude carbolic acid is neglected but cresylic acid is firmer owing to lessened production. There is more enquiry for pitch, but the ideas of makers and consumers as to price differ somewhat and business is difficult to arrange. Sulphate of ammonia is very quiet, both for home and export.

Duty on Power Alcohol

A DEPUTATION arranged by the British Empire Producers Organisation waited on the Chancellor of the Exchequer last week to urge the removal of certain restrictions and duties which it was stated at present prevent the free supply of power alcohol, or admixtures thereof, to consumers in the United Kingdom.

The Chancellor of the Exchequer, in reply, stated that there had always been higher duties on imported alcohol than on alcohol produced within these islands, on account of the Excise restrictions that imposed a special burden on home manufacture and he was not prepared to put the home producer in a worse position than the importer. As the result of the rebate of 3d. the net duty on Empire spirits imported for power purposes would only amount to 1d. or 2d. per proof gallon. With regard to the particular preference given to Empire spirit, by placing an additional duty of 2s. 6d. on foreign produced spirit, he was not in a position to say that the Government was prepared to go back on a clearly declared policy with regard to preference to the Empire. Apart from this matter he saw difficulties in the way of adopting a different scale of preference duties for power alcohol from that applicable to alcohol intended for other purposes. The subject, however, was very complex, and he would consider it further.

Chemical Matters in Parliament

Gretna Factory

Major W. Murray (House of Commons, June 29) asked the Secretary of State for War whether, seeing that the Committee appointed to consider the respective merits of certain explosive factories declared their preference for Gretna factory, he would say why their recommendation had been neglected?

Lieut.-Col. Stanley said the Government had before them all the various solutions of this difficult question propounded by the Committee, but, after a review of all the circumstances, came to the conclusion which he had already announced.

German Colours and Dyestuffs

Sir W. Barton (House of Commons, June 30) asked the President of the Board of Trade whether very serious money loss, as well as loss of business opportunity and connexion, was being caused by the delay in liberating from the Customs colours and dyestuffs imported from Germany, in connexion with which the licences issued by the licensing committee and the contracts with the colour makers had been produced, and every requirement of the German Reparation (Recovery) Act fulfilled; and would he give urgent instructions for expedition in this matter?

In reply, Sir R. Horne said he had no knowledge of the losses referred to, but if full details of any particular case of delay were furnished, he would look into the matter.

Trade Combinations

Mr. Parkinson (House of Commons, June 30) asked the President of the Board of Trade whether it was intended to introduce legislation authorising the Board of Trade to exercise surveillance over the existence, development and activities of trade combinations on the lines of the recommendations contained in the report of the Committee on Trusts?

Sir P. Lloyd-Greame said the Government hoped to introduce in due course legislation in respect of trade combinations, but he could not at present indicate precisely the lines on which that legislation would follow.

Safeguarding of Industries

In the House of Commons on June 29 Mr. Baldwin (President of the Board of Trade) gave a verbal assurance that the Safeguarding of Industries Bill would come into operation on September 30.

Mr. Hogge (House of Commons, June 30) asked the Chancellor of the Exchequer whether any estimate had been formed of the amount which would be collected in respect of the Customs duties imposed by the Safeguarding of Industries Bill?

Col. P. Williams asked whether any estimate had been made of the amount of goods to be dealt with by the Customs under the Safeguarding of Industries Bill; whether there was adequate warehousing accommodation for the purposes of the Bill; and, if not, what would be the cost of providing such accommodation?

Sir P. Lloyd-Greame said that in 1920 imports of goods of the classes specified in the Schedule amounted approximately to £3,000,000. It was not possible to frame any accurate estimate of what the value of such imports would be after the passage of the Bill. With regard to Part II. of the Bill, until it was known to what goods the duty would be applied (and this could only be known after complaints had been investigated by Committees to be set up) it was impossible to frame any reliable estimate of the revenue likely to be collected. It was not in contemplation to allow bonded warehousing for goods subject to duty under the Bill. In any event bonded warehouses were not provided by the Crown.

Captain Wedgwood Benn (House of Commons, July 4) asked the President of the Board of Trade whether it would be necessary to increase the staff of the Revenue Department in connexion with the work to be cast upon them by the Safeguarding of Industries Bill; if not, by whom such work would be done; whether he had formed any estimate of expenditure in connexion with that matter, including the expenditure of the Board of Trade Committee, referees, &c.; and whether he thought it likely that a Supplementary Estimate would be needed this year for the performance of these duties.

Mr. Baldwin said he understood that the Board of Customs were not at present in a position to form any estimate as to what increase of staff, if any, might be necessary to enable them to carry out their duties under the proposed legislation. He feared it was impossible to form any useful estimate as to

expenditure by the Board of Trade which would be involved, as this must depend very largely on the number of inquiries to be made under Part II. of the Act; but it did not seem likely to be at all considerable. As to the question of a Supplementary Estimate, it was impossible to give a definite reply.

On the adjournment (House of Commons, July 4), Lieut.-Col. Hall asked the Leader of the House when it was proposed to go on with the Safeguarding of Industries Bill.

Mr. Chamberlain said they had intended to have another day this week, but that appeared to be impossible. They would have to try and make progress next week.

In reply to Captain W. Benn (House of Commons, July 6) Sir W. Mitchell-Thomson said it was not the intention of the Government to denounce any commercial treaties at the present time. If the inquiries provided for in the Safeguarding of Industries Bill disclosed cases of dumping due to depreciation of exchange, where an order would be at variance with the terms of a commercial treaty, the desirability of denouncing such treaty would be considered.

German Reparation (Recovery) Act

Captain W. Benn (House of Commons, July 4) asked the President of the Board of Trade if he could give any figures showing the cost of operating the German Reparation (Recovery) Act at the ports and centrally, including the cost of the committee set up in connexion with it.

Mr. Baldwin said as to the general work of collecting the levy, he would refer Captain Benn to the answer given by the Financial Secretary to the Treasury on June 13 to Mr. Kiley (see THE CHEMICAL AGE, June 18, p. 699). As regards the Committee, the only expenditure out of public funds was £6 13s. paid to shorthand writers, in addition to a sum of approximately £270 in respect of the salaries of officials seconded for the secretarial work.

Captain W. Benn then asked the President of the Board of Trade whether he could give the figures of imports into the United Kingdom from Germany since the coming into force of the German Reparation (Recovery) Act, and figures for the same period prior to that date.

Mr. Baldwin said the figures of imports into this country from Germany were compiled quarterly, and he hoped to be able to furnish them in the course of the current month.

Anglo-American Oil Company

Colonel Wedgwood (House of Commons, July 5) asked whether the Anglo-American Oil Co., being the British branch of the Standard Oil Co., was issuing capital in this country; and whether, seeing that such issue would tend to increase the strength of that monopoly, His Majesty's Government could take any steps to check such issue.

Sir Philip Lloyd-Greame said he understood that the issue had been authorised by the shareholders. For reasons of general financial policy it was decided in November, 1919, to abandon the Government restrictions on capital issues imposed during the war, and it would be both impracticable and undesirable to re-impose such restrictions.

British Dyestuffs Corporation

In the House of Commons, on Wednesday, a message was received from the House of Lords intimating that they had agreed to the British Dyestuffs Corporation (Railways Transfer) Bill, without amendment.

Export of Dangerous Drugs

THE Home Secretary gives notice that licences for the export of drugs to which the Dangerous Drugs Act applies are now issued by the Home Office, instead of by the Board of Trade. Application for licences will, for the present, be accepted if made on the Board of Trade Application Form A; they should be addressed to the Under-Secretary of State (Accounts Branch), Home Office, Whitehall, London, S.W.1. The following is a list of the drugs to which the Act applies, and for which licences are required: Raw opium, medicinal opium, morphine, cocaine, ecgonine and diamorphine (heroin), and their respective salts, and any preparation, admixture, extract, or other substance containing not less than one-fifth per cent. of morphine or one-tenth per cent. of cocaine, ecgonine, or diamorphine (heroin). The Home Secretary, in pursuance of Section 12 of the Act, has fixed 2s. 6d. as the fee for each export licence, and a postal order for this amount should be sent with the application.

From Week to Week

DEPOSITS OF COPPER are reported to have been discovered at Sandwick, in Shetland.

On Tuesday the PRINCE OF WALES inspected the Bootle works of Johnson Brothers (Dyers), Ltd.

Mr. JOHN DAVIE has been appointed receiver and manager of the British Vegetable Oil Extraction Corporation, Ltd.

THE DEGREE of Doctor of Science of the University of Manchester is to be conferred upon Messrs. R. G. Fargher, F. W. Attack, and Colin Campbell.

Miss M. G. TOMKINSON, of Girton College, has been awarded a Travelling Fellowship of £200 as assistant lecturer in chemistry at Toulouse University.

The Board of Trade Licensing Section announces that as from July 4 the RESTRICTIONS on THE EXPORT of coal, coke, and manufactured fuel have been removed.

Mr. JOHN GREENHAM, of the Nova Scotia Pure Milk Co., Ltd., who was formerly on the staff of the Belfast City Analyst, has been made a Fellow of the Chemical Society.

Sir Clifford Cory, M.P., and Messrs. F. W. Barker, Herbert Guedalla, and Henry E. Leetham have JOINED THE BOARD of the General Petroleum Company of Trinidad, Ltd.

THE LIBRARY of the Chemical Society will be closed for stocktaking from August 1st to 13th inclusive, and will close each evening at 5 o'clock from August 15th to September 10th.

Eight persons are stated to have been killed and 36 injured in AN EXPLOSION which occurred on Monday at the Standard Oil Company Refinery at Whiting (Indiana). The cause of the explosion is unknown.

Dr. C. F. Chandler and Dr. W. H. Nichols, both of whom are past presidents of the Society of Chemical Industry, have been elected HONORARY MEMBERS of the American Chemical Society.

In the annual report of H.M. INSPECTOR OF EXPLOSIVES for the year 1920, it is stated that there had been 76 accidents in the manufacture of explosives during the year, causing two deaths and injury to 44 persons.

It is stated that, as a result of experiments carried out by MM. Langrouge and Boule-Barelle, it has been found possible to obtain foundry coke from SAAR COAL. A high-temperature process is employed, and the yield of tar and other derivatives is said to be high.

Cable advices from Chile state that the NITRATE ASSOCIATION has fixed the selling price of nitrate of soda at 14s. per quintal, f.a.s., for July 1921 to March, 1922, delivery. Additional prices of 9s. 9d. for April and 9s. 3d. for May-June delivery were also fixed.

Two scholarships, each of the value of £200, are to be granted by the Rubber Advisory Committee of the Northern Polytechnic Institute, Holloway, to enable students who have obtained a good degree in chemistry to attend for a year's special TRAINING IN RUBBER TECHNOLOGY.

Benzol and By-Products, Ltd., announce that there is no foundation for the RUMOURS to the effect that the Company's Colliery has suffered damage owing to the strike. They add that the colliery, coke ovens, and by-product plant have been preserved intact and ready for resumption of operations.

A general meeting of the members of the ROYAL INSTITUTION was held on Monday afternoon, Sir James Reid, vice-president, in the chair. Miss F. E. I. Smythe and Mrs. A. J. Webb were elected members. The chairman announced that the managers had re-elected Sir James Dewar Fullerian Professor of Chemistry.

In recognition of his published papers on "Chemical Dynamics," the Senate of the University of London has conferred the degree of Doctor of Philosophy (Ph.D.) in the Faculty of Science on Mr. H. E. COX, M.Sc., F.I.C., chief assistant to Mr. George Rudd Thompson, F.I.C. (public analyst for Monmouthshire and the county borough of Newport), and deputy agricultural analyst for Monmouthshire.

The Board of Trade announce that by an agreement made with the German Clearing Office now awaiting the approval of the Reichstag, the time for LODGING CLAIMS with the British and German Clearing Offices by their respective nationals under Article 296, Section III., Part X., of the Treaty of Versailles has been extended to September 30, 1921,

No further claims under the above Article will be accepted after that date by the Clearing Offices concerned.

The Annual Assembly of Faculties of University College was held on Tuesday at the temporary hall, Gordon Street. The president of the Royal Society (Professor C. S. Sherrington) presided. In presenting the report on the work of the session, the provost stated that the senate had accepted the OFFER BY THE GOVERNMENT of a site of 11½ acres to the north of the British Museum. It would be used primarily for the erection of a senate house and the removal to it of King's College, Strand.

Speaking at the annual meeting of the Royal Agricultural Society of England last week, Lord Bledisloe entered a special plea for special representation on the council of persons interested in agricultural science and research. He said that, being faced by the stern necessity of doing something to stimulate and promote SCIENTIFIC RESEARCH IN AGRICULTURE, especially in view of the giving up of the Woburn experimental station, he must press for a declaration that such representation on the council as he had asked for was desirable.

The plant of the Hydro-Oxygen Company, installed at a cost of £50,000, which was to commence work on the following Monday after being under construction for nine months, was imperilled on the night of July 1 by a fire (due, it is believed, to SPONTANEOUS COMBUSTION) at the Crown Wagon & Engineering Works at Maindy, Cardiff. The efforts of two brigades, police, and a detachment of soldiers from Cardiff barracks were successfully directed to preventing the spread of the flames to the plant.

CAPTAIN H. RIALI SANKHY, presiding over the summer meeting of the Institution of Mechanical Engineers, which began at the Institution Building, Storey's Gate, on June 30, welcomed to the conference the deputation of American engineers who visited this country to present the "John Fritz" medal to Sir Robert Hadfield. After thanking the visitors for the honour done to one who was a vice-president of their institution, he conferred upon Mr. Ambrose Swasey, the chairman of the deputation, the honorary membership of the institution.

The following Sumatra RUBBER-PRODUCING COMPANIES in the Harrisons and Crosfield group have decided to restrict production to 50 per cent. of normal as from July 1, 1921:—Asahan Rubber Estates; Bah Lias Tobacco and Rubber Estates; Bila (Sumatra) Rubber Lands; Central Sumatra Rubber Estates; Mendaris (Sumatra) Rubber and Produce Estates; Tandjong Rubber Co.; Toerangie Sumatra Rubber and Produce Estates; United Serdang (Sumatra) Rubber Plantations; Sialang Rubber Estates; Soengei Rampah Rubber and Coconut Plantations Co., and Wampoe Tobacco and Rubber Estates.

Seventy delegates of the International Union of Pure and Applied Chemistry met at a CONFERENCE IN BRUSSELS from June 27 to June 30. Sir William J. Pope, K.B.E., and Dr. Stephen Miall and others represented Great Britain, while Dr. F. G. Cottrell was among the representatives of the United States of America. The agenda comprised the fixing of atomic weights and a chemical nomenclature, the creation of three international institutes for fixing chemical and physico-chemical standards in Belgium, France, and Great Britain, the establishment of thermo-chemical standards, and national and international laboratories for research into fuels, hygienic conditions in the chemical industry, and international patents.

Speaking at the Empire Universities Congress held at Oxford on Tuesday Dr. C. H. Desch, professor of metallurgy at the University of Sheffield, said that the man who had been highly trained in a specialised study, but who had never conceived of his science in its relation to the whole body of knowledge, was imperfectly educated. In a scientific leader of industry whose functions included the interpretation of science to the world, narrowness of outlook was a grave defect, as it was in the public administrator, who would be increasingly chosen in the future from among those trained in the methods and results of science. The most IMPORTANT SAFEGUARD against such a limited vision was the historical spirit. The reconciliation of the scientific and humanistic sides of education was only to be effected by bringing the two into closer relationship by making the teaching of history scientific and that of science historical.

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A New Pulveriser

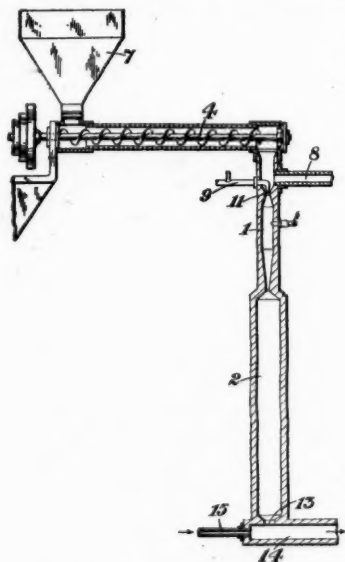
THE Selby Engineering Co., Ltd., of 92, Fenchurch Street, E.C.3, have placed on the market a new form of pulveriser known as the "Ideal," which, it is claimed, will take lumps of material up to the size of the fist and will reduce the material to any required degree of fineness, interchangeable screens being provided. This pulveriser consists of a dust-tight casing, inside which is a rotating disc provided with specially formed projections concentrically arranged, by means of which the material is ground. It is constructed to grind practically any kind of material and is made in four sizes giving from 1,500 to 2,500 revolutions per minute.

Patent Literature

Abstracts of Complete Specifications

164,050. NITROGEN COMPOUNDS FROM NITROGEN OR GASEOUS MIXTURES CONTAINING THE SAME, PROCESS AND APPARATUS FOR THE SYNTHETIC PRODUCTION OF. W. M. Williams, 89, Selborne Road, Southgate, London, N. 14, and T. H. Haynes, 25, Denmark Avenue, Wimbledon, Surrey. Application date, December 3, 1919.

Gaseous nitrogen is fixed by bringing it into contact with a mixture of a sub-divided base—e.g., an alkaline earth oxide, and free carbon at a high temperature. The reaction temperature is obtained by exploding carbon monoxide and oxygen. Air may be used as the source of oxygen, and may serve also as the source of nitrogen; an addition of 3-5 per cent. of oxygen may be necessary to maintain the high temperature. The reaction may be effected by continuously injecting a mixture of finely pulverised base and carbon together with the gases preheated to 350-400°C. into a reaction chamber which



164,050

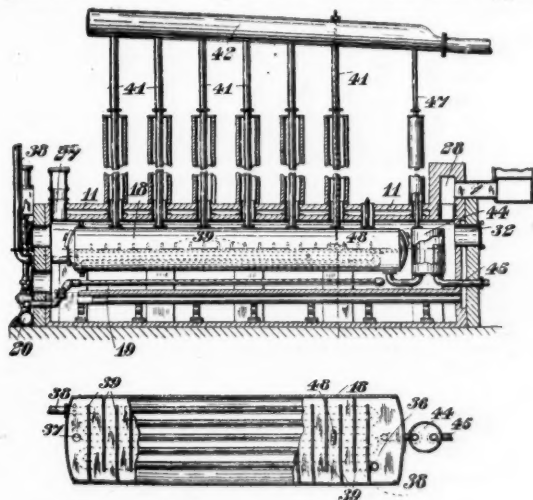
does not permit free expansion of the gases. The carbon monoxide may be used in the form of producer gas and the carbon in the form of peat charcoal. The solid materials are fed from a hopper 7 by a conveyor 4 to the inlet end of the explosion chamber 1. Air is blown through the pipe 9 to the injector nozzle 11, and draws the producer gas, preheated to 600-700°C., through the pipe 8, while additional oxygen may be supplied if necessary through the pipe 10. The mixture is ignited by sparking in the chamber 1, which is provided with a conical lower end, and the reaction products are carried down to the chamber 2 and thence through the opening 13 to the chamber 14. The resulting product, e.g., calcium cyanamide, may be treated with steam introduced through the pipe 15 to produce ammonia which may then be absorbed in a scrubber. The waste gases from the reaction vessel may be dried and returned for further use.

164,053. SCARLET LAKES, MANUFACTURE OF. British Dyestuffs Corporation (Blackley), Ltd., Blackley, Manchester, J. Baddiley, "Glencoin," Fog Lane, Didsbury, Manchester, and J. Hill, 34, Woodlands Road, Cheetham Hill, Manchester. Application date, December 5, 1919.

The monoazo dyestuff derived from metaxylylidine-sulphonic acid ($\text{CH}_3 : \text{CH}_2 : \text{NH}_2 : \text{SO}_3\text{H} = 1 : 3 : 4 : 5$) and R-salt ($2 : 3 : 6$ -naphtholdisulphonate) is combined with the lake-forming metallic bases to give scarlet lakes which are fast to light, and are superior to the colours of the Ponceau class.

164,098. DISTILLING APPARATUS. N. H. Freeman, 9, Southampton Street, Holborn, London, W.C. 1. Application date, February 27, 1920.

The apparatus is for fractionally distilling oil and other liquids with the object of obtaining products in which variations in chemical and physical properties are reduced to a minimum. The apparatus comprises a number of separately heated stills, in each of which a different constant working temperature is maintained by controlling the supply of heat by means including a thermostatic apparatus in the still in contact with the material. The distillate from some of the stills is passed into other stills which have a lower working temperature, and the residue from some of the stills is passed into other stills having a higher working temperature. Each still 18 is provided with a storage tank and measuring tank for the oil supply, while the distillate passes through a pipe 42 to a condenser and storage tanks. The working temperature in successive stills increases in steps of about 5-10°C. The distillates and residues from the various stills may be passed directly to other stills for treatment by a system of valve-controlled pipe-lines, and the stills may be arranged at different heights to facilitate this operation. Each still 18 is supported



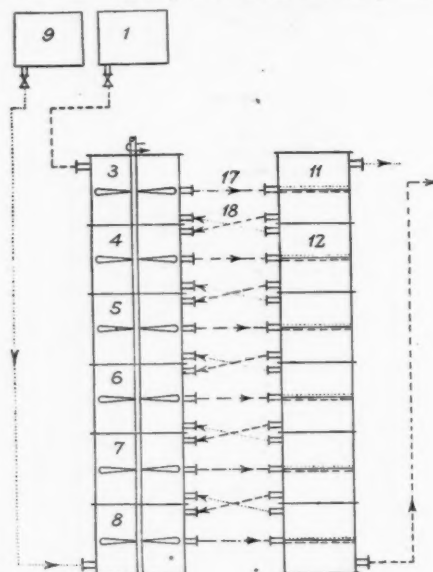
164,098

in a chamber 11, and is heated by a gas burner 19, supplied from a common main 20 through the automatic gas-controlling device. Preheated air for combustion enters through a conduit 27, and the combustion products pass out through a conduit 28. The still is provided with an internal horizontal partition 36, dividing it into two compartments, which communicate through an opening 37 at one end. The oil supply pipe 38 traverses the lower compartment in a sinuous path, and the preheated oil is delivered into the upper compartment at the further end. The partition 36 is provided on its upper side with transverse baffles 39 extending from each side nearly to the other side, so that the oil in passing from one end to the other is forced to travel in a sinuous course. The distillate passes through a series of pipes 41 to the collecting main 42. The residual oil passes to a chamber 44 provided with a pipe 47 to take off any distillate, and then passes through a pipe 45 to another still at a higher temperature. The temperature controller comprises a glass bulb 48 in the still, having a conduit extending to one end of a mercury column, so that if the temperature rises above the desired point the mercury column rises and completes an electric relay circuit which controls a valve in the gas supply conduit.

164,115. FATS AND OILS, PROCESS FOR THE REMOVAL OF FATTY ACIDS, RESINS, BITTER AND MUCILAGINOUS SUBSTANCES FROM. H. Bollmann, Alsterdamm 1, Hamburg, Germany. Application date, March 1, 1920.

Fatty acids, &c., are removed from fats and oils by lixiviation with solvents such as methyl, ethyl, or amyl alcohol,

acetone, or acetic ester, which dissolve the acids but not the neutral oils. Oil passes from a container 1 to the first stage 3 of a washing apparatus comprising six stages, 3, 4, 5, 6, 7, 8, and alcohol passes from the container 9 to the bottom of the last stage 8, and then upwards through the stages, in which it dissolves increasing amounts of acids. The mixture of oil and alcohol in the stage 3 passes through the pipe 17 into the settling vessel 11 in which they settle out by gravity, and the oil passes through the pipe 18 to the second stage 4 while the alcohol and acid passes off through a pipe 19 to a distillation apparatus for the recovery of alcohol and fatty acids. The



oil is mixed with purer alcohol in the stage 4, and then passes to the separator 12, from which the oil passes to the next stage 5, and the mixture of alcohol and fatty acids to the first stage 3, and so on. The temperature is kept at 20-30°C., and the process is cyclic. If a hard fat such as coco-nut oil is to be treated an eight-stage washing column is used without an agitating mechanism, but with a retarding means such as Raschig rings. The liquids are separated by gravity in the bottom of each stage, and the oil passes by a syphon to the next lower stage, while the alcohol passes by another syphon to the stage next above. The temperature is kept at 40-50°C.

164,183. COAL GAS AND LIKE GAS, PURIFICATION OF. C. C. Carpenter, 709, Old Kent Road, London, S.E. Application date, March 24, 1920.

When coal gas is passed over a heated contact substance such as iron or nickel or their compounds to convert the carbon disulphide into sulphuretted hydrogen, the contact substance is usually re-vivified by passing air over it to burn off the carbon deposit. The object is to avoid an excessive temperature during this operation, which might reduce the efficiency of the contact substance. This is effected by mixing waste furnace gas with the air in such proportion that the oxygen content of the mixture is 5 per cent. by volume. The combustion is then sufficiently slow to avoid overheating at whatever rate the gases are passed over it. The proportion of waste gas is reduced as the re-vivification proceeds, until finally air alone is used. The total volume of the re-vivifying gas passed over the contact substance is adjusted so that the quantity of oxygen passing per unit time is constant for all proportions of waste gas to air.

164,218. AZODYES, MANUFACTURE OF. W. Carpmael, London (From Farbenfabriken vorm. Friedr. Bayer & Co., Leverkusen, near Cologne, Germany.) Application date, May 6, 1920.

A diazo compound of 4-nitraniline-2-sulphamide (1-amino-4-nitrobenzene-2-sulphamide) in which one or two hydrogen atoms of the amide group are substituted by an alkyl, aryl, or aralkyl group, is combined with a 2-naphthylamine sulphonic

acid or a derivative, or a 2-amino-8-naphthol sulphonic acid or a derivative. To obtain substitution products of the parent amine the known 4-nitro-1-chlorobenzene-2-sulphonic acid chloride is treated with ethylaniline to obtain the 4-nitro-1-chlorobenzene-2-sulphoethyl-phenylamide. This is then treated with an alcoholic solution of ammonia to convert the chlorine atom into the NH_2 group. The diazo compound combines with the nucleus of the naphthalene compound which contains the amino group, and the dyes thus obtained may be reduced in an alkaline solution. The dyes give blue shades on wool.

164,270. ORES, APPARATUS FOR WASHING OR SEPARATING. M. Whitworth, Crumpwell, Oswestry. Application date, August 31, 1920.

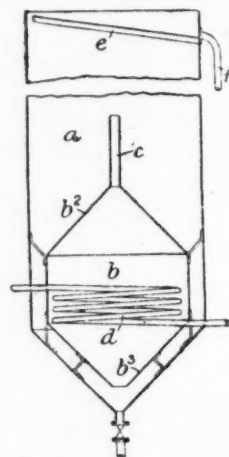
The ore is placed on a perforated false bottom of a sluice box and is carried over the bottom by a stream of water. A second stream of water is passed upwards through the perforated bottom and carries away the tailings, leaving the mineral matter.

NOTE.—The following specifications which are now accepted were abstracted in THE CHEMICAL AGE when they became open to inspection under the International Convention: 137,291-2-3 (M. Melamid), relating to the manufacture of resin-like bodies, see Vol. II., page 287; 141,057 (C. Moureu and A. Lepape), relating to the manufacture of acrolein, see Vol. II., page 643; 146,356 (W. Freytag), relating to washing gases and vapours, see Vol. III., page 353; 146,397 (Soc. l'Oxylithe) relating to washing or purification and drying of air and other gases, see Vol. III., page 353.

International Specifications not yet Accepted

163,011. TAR, REMOVING WATER FROM. Bismarckhütte, Bismarckhütte, Oberschleisen, Germany. International Convention date, May 6, 1920.

A vessel *b* having conical ends *b*¹, *b*² is provided with a pipe *c* projecting upwards, and is arranged in an outer container *a*



163,011

which contains the tar to be treated. The vessel *b* is open at both ends, and contains a heating coil *d*. The tar is projected upwards against the plate *e* which is slightly inclined, and the water adheres to the surface and finally passes over the edge into the space above, which is provided with a discharge pipe *f*.

163,016. CELLULOSE ETHERS. L. Lilienfeld, 1, Zeltgasse, Vienna. International Convention date, May 5, 1920.

Cellulose is impregnated with a solution of caustic alkali, the excess of which is not removed, and then treated with the alkylating, aralkylating, or arylating agent. The ripening process involved in the production of alkali cellulose is not necessary.

163,017-8. CELLULOSE AND OTHER CARBOHYDRATE ETHERS. L. Lilienfeld, 1, Zeltgasse, Vienna. International Convention date, May 5, 1920.

163,017. Cellulose, starch, dextrine, their conversion pro-

ducts or derivatives, are treated with alkylating, aralkylating, or arylating agents, in the presence of at least 15 parts of a 30-50 per cent. caustic alkali solution.

163,018. Cellulose, starch, dextrine, or the like is mixed with caustic soda which is either dry or only partly dissolved, and is then treated with the alkylating, aralkylating, or arylating agent to produce the corresponding ether. The mixture with alkali may be effected in air or inert gas, or *in vacuo*, and at various temperatures. The final products obtained by this process have better water-resisting properties.

163,026. NITROUS GASES. Norsk Hydro-Elektrisk Kvaelfstofaktieselskab, 7, Solligaten, Christiania. International Convention date, May 5, 1920.

Gases containing oxides of nitrogen are treated with a solid absorption agent to absorb the oxides, and the product is then decomposed to liberate the oxides. The process is carried out in acid-proof and fire-proof vessels surrounded by gas-tight jackets through which the gases are passed before entering the vessel. The absorbing material may be a mixture of a dry base and a metallic oxide, as described in specification 137,071 (see THE CHEMICAL AGE, Vol. II., page 261), and the material may be heated to 300°-600°C. Two reaction vessels are used in combination and the hot gases are first passed round the decomposition vessel containing the saturated material, a small portion being then passed into the vessel to facilitate decomposition. The remainder then passes through the jacket of the second vessel which contains de-nitrated material, and then into the material until it is saturated. The flow of gases is then reversed.

LATEST NOTIFICATIONS.

- 165,438. Process for the manufacture of saccharin. Soc. Chimique Des Usines Du Rhone. June 25, 1920.
 165,439. Cellulose ester Compositions Du Pont De Nemours & Co., E. I. June 19, 1920.
 165,424. Process for producing a grease. Balis, L. W. August 5, 1919.
 165,445. Process of drying and compressing raw peat and the like. Torfverwertungsges. Der Pohl und Von Dewitz. June 22, 1920.
 165,446. Process for the manufacture of 1-allyl-3'-7-dimethyl-xanthine. Hoffmann-La Roche & Co., Akt. Ges. F. June 22, 1920.
 165,400. Mercury vapour pumps for high vacua. Akt. Ges. Brown, Bouverie, et Cie. June 24, 1920.
 165,408. Process for the production of artificial resins. Pummerer, R. June 25, 1920.
 165,410. Method and means for measuring physical quantities by means of a viscous substance. Noeggerath, J. E. June 23, 1920.
 165,451. Adsorption and purification of gases and vapours. Adler, R. June 28, 1920.

Specifications Accepted with date of Application

- 145,524. Cellulose esters of organic acids, Manufacture of. Akt.-Ges. für Anilin Fabrikation. July 11, 1914.
 149,340-1. Purification or washing of gases, Process and apparatus for. A. Knopfmacher and R. Adler. April 12, 1919, and August 8, 1919. 149,341, addition to 149,340.
 149,688. Alkyl esters of sulphuric acid, Process for the production of neutral. E. Kuh. August 8, 1919.
 156,739. Filter plates. F. Krupp Akt.-Ges. Grusonwerk and P. L. Fauth. September 3, 1919.
 164,762. Acetone and butyl alcohol, Fermentation of starchy material for the production of. C. Weizmann and H. M. Spiers. June 3, 1918.
 164,770. Vulcanisation of rubber and treatment of vulcanised rubber. H. P. Stevens. Oct. 6, 1919.
 164,785. Phthalic acid and anhydride, Process of manufacture of. British Dyestuffs Corporation, Ltd., A. G. Green and J. W. Porter. January 10, 1920.
 164,793. Condensers, dephlegmators and column stills. R. P. Douglas. February 9, 1920.
 164,800. Crude mineral oils and the like, Process and apparatus for obtaining volatile fractions from. E. F. Engelke. February 12, 1920.
 164,803. Hydrofluoric acid from the sulphonating mixtures of organic sulpho acids and calcium fluoride, Method of obtaining. W. Miersch. February 13, 1920.
 164,808. Catalysts and catalytic reactions. W. Feldenheimer and W. W. Plowman. February 17, 1920.
 164,867. Centrifugal separating apparatus. R. A. Sturgeon. March 18, 1920.
 164,935. Gasification of coal or other carbonaceous material, Plants and processes for. Woodall, Duckham & Jones (1920), Ltd., and Sir A. M. Duckham. April 28, 1920.

164,949. Gasifying fuel, Plants for. Woodall, Duckham & Jones (1920), Ltd., and Sir A. M. Duckham. May 14, 1920.

164,989. Thermic process of any kind, Process and apparatus for performing. K. A. F. Hiorth. August 4, 1920.

Applications for Patents

- Adler, R. Absorption and purification of gases and vapours. 17,520. June 27. (Czecho-Slovakia, June 28, 1920.)
 „ Manufacture of decolorising charcoal of high activity. 17,701. June 29. (Czecho-Slovakia, July 5, 1920.)
 British Dyestuffs Corporation, Ltd. Production of direct-dyeing cotton colours. 17,630. June 28.
 Carteret, G. Devaux, M. Preparation and purification of titanium compounds. 17,499. June 27.
 Chemische Fabriken Worms Akt.-Ges. Manufacture of anthraquinone. 17,963. July 1. (Germany, September 13, 1920.)
 Elektrizitätswerk Lanza. Production of crotonic acid from croton aldehyde. 17,527. June 27. (Switzerland, July 2, 1920.)
 Ellis, G. H. Dyeing or colouring acetyl cellulose. 17,661. June 29.
 Etablissements Métallurgiques de la Gironde. Process for cleaning aluminium. 17,616. June 28. (France, April 11.)
 „ Utilisation of waste aluminium. 17,617. June 28. (France, April 11.)
 Hoffmann-La Roche & Co., F. Process for manufacture of allyl arsenic acid. 17,710. June 29. (Switzerland, July 26, 1920.)
 „ Process for manufacture of isopropylallylbarbituric acid. 17,799. June 30.
 Hormann, L. Manufacture of acid anhydrides. 17,833. June 30. (Germany, June 30, 1920.)
 Howe, B. Production of zinc oxide or blown oxides from zinc ores or products. 17,619. June 28.
 Hunt, B. Process for recovery of sulphur, metallic sulphides, &c. 17,574. June 28.
 Jones, F. C. Process for manufacture of rubber articles. 17,935. July 1.
 Markham, C. P. Distillation of solid carboniferous matter. 17,587. June 28.
 Napp, H. R. (Hoffmann-La Roche & Co.). Process for manufacture of isopropylallylbarbituric acid. 17,799. June 30.
 Picard, H. F. K. Production of zinc oxide or blown oxides from zinc ores or products. 17,619. June 28.
 Reid, T. A. Manufacture of gaseous fuel from lime-kiln gas. 17,873. July 1.
 Schwarzkopf, R. Method of manufacture of raw alkali-cellulose for working into viscose. 17,810. June 30. (Germany, June 30, 1920.)
 Soc. Ricard, Allenet, et Cie. Manufacture of acetone and butyl alcohol by fermentation. 17,834. June 30. (France, Feb. 28.)
 Staveley Coal and Iron Co., Ltd. Distillation of solid carboniferous matter. 17,587. June 28.
 Wacker, Ges. für Elektrochemische Industrie Ges., Dr. A. Manufacture of acid anhydrides. 17,833. June 30. (Germany, June 30, 1920.)
 Williams, F. G. Dyeing or colouring acetyl cellulose. 17,661. June 29.

Winding Up E.P.D.

A MEETING of M.P.s, summoned jointly by the British Commonwealth Union and the Federation of British Industries, was held at the House of Commons on June 30, to consider some of the provisions of the Finance Bill in regard to the winding up of E.P.D. Sir William Pearce was in the chair. Considerable discussion took place on the forward contracts clause, which has been drafted by the Federation to meet what is considered a serious grievance affecting a large number of firms in the country. It was decided to ask the Chancellor of the Exchequer to receive a deputation, with the object of securing some concession when the report stage of the Bill is reached. A new clause is to be put down by the Industrial Group in the House for consideration on report. An effort will also be made to secure allowance for bad and doubtful debts, and to this end a new clause will be moved.

It is reported that a German firm proposes to install a factory in the Argentine Republic for the purification of oil obtained from Argentine linseed, and a technical personnel is being recruited under direction of Dr. Reichau. The quality of the samples obtained by the process leads the Argentine Consul to regard this as an important step in the development of native industries.

Market Report and Current Prices

Our Market Report and Current Prices are exclusive to THE CHEMICAL AGE, and, being independently prepared with absolute impartiality by Messrs. R. W. Greeff & Co., Ltd., and Messrs. Chas. Page & Co., Ltd., may be accepted as authoritative. The prices given apply to fair quantities delivered ex wharf or works, except where otherwise stated. The weekly report contains only commodities whose values are at the time of particular interest or of a fluctuating nature. A more complete report and list are published once a month. The current prices are given mainly as a guide to works managers, chemists, and chemical engineers; those interested in close variations in prices should study the market report.

Market Report

THURSDAY, July 7.

It is a matter for satisfaction that as we go to press the trade situation looks very much brighter than has been the case for some considerable time. The principal industrial troubles seem to be out of the way; there is a much better tone, and an actual revival in business is confidently expected.

There is a very much better inquiry, but there has not yet been time, of course, for it to be translated into business.

There is a reasonable export inquiry, and better business seems likely to follow the improved situation at home.

General Chemicals

ACETONE passes steadily into consumption, and the price is fully maintained.

ACID ACETIC is inclined to be firmer, and with limited stocks the position is fairly healthy.

ACID CITRIC.—Large parcels have been on offer, and, with a limited demand, the tendency is slightly easier.

ACID FORMIC is rather lower in price, but little business is reported.

ACID TARTARIC is still on the down grade, with little demand. BARIUM CHLORIDE remains slow of sale, although the price would appear to have reached the bottom.

BLEACHING POWDER.—No improvement is to be detected, and the demand is practically nil.

COPPER SULPHATE is unchanged.

FORMALDEHYDE remains a purely hand-to-mouth business, although lower prices seem unlikely.

LEAD ACETATE.—There is still some inquiry but little business.

LEAD NITRATE is uninteresting.

POTASH, CARBONATE, BICHRIMATE and CAUSTIC.—In the absence of business there is nothing to report.

POTASH PERMANGANATE.—There is a steady trade, but the aggregate turnover is small.

POTASH PRUSSATE is firmer in price, and little stock is held.

SODA ACETATE is lifeless.

SODA BICHRIMATE has been passing into consumption rather more freely, and the price is a little firmer.

SODA CAUSTIC.—There have been one or two export inquiries which have not, so far, led to business.

SODA HYPOSULPHITE.—Unchanged.

SODA PHOSPHATE is rather a weak market, with little doing.

SODA PRUSSATE.—No further fall in price is reported, and sales are few and far between.

SODA SULPHIDE.—Certain export business has been put through. The tendency remains easy.

TARTAR EMETIC is freely offered, and the price is lower.

Coal Tar Products

Although there is still not very much business doing in coal-tar products, supplies for prompt delivery are increasingly difficult to obtain. This particularly refers to benzol and creosote oil.

90 PER CENT. BENZOL is quoted nominally at 3s. a gallon on rails.

PURE BENZOL is quoted at 3s. 3d. on rails.

CREOSOTE OIL for prompt delivery is difficult to obtain and is quoted at 8½d. to 9d. a gallon in the North and 9d. to 9½d. in the South.

CRESYLIC ACID is quoted at 2s. 4d. on rails for Pale 97/99, while Dark is worth 2s. to 2s. 2d.

SOLVENT NAPHTHA is quoted at 2s. 6d. on rails.

HEAVY NAPHTHA is worth 2s. 5d.

NAPHTHALENE is inactive. Crude qualities are quoted from £7 to £11 per ton, and Refined from £17 to £23 per ton.

Coal Tar Intermediates

As indicated last week a better inquiry has been experienced since the settlement of the Coal Strike, and this tendency continues. The actual business passing, however, is fairly small, but some trade has been done, and better conditions are expected before long.

ALPHA NAPHTHYLAMINE remains quiet, but without reduction in price.

ANILINE OIL AND SALT.—Some business has been done at recent quotations, but there is practically no demand for export.

BETA NAPHTHOL remains quiet with little inquiry.

BENZIDINE BASE is quiet and steady.

DIMETHYLANILINE.—There is but little of this material available, and next to no demand.

DIPHENYLAMINE remains in request at recent values.

NITRO BENZOL.—Some business has been done in this material at recent quotations, and a fair inquiry has been experienced.

PARANITRANILINE is in small demand, and the price remains unchanged.

SALICYLIC ACID continues firm, with an upward tendency.

PITCH.—The price is unchanged, and very few transactions have been reported during the last few days.

Sulphate of Ammonia

The home trade prices have been reduced for July/August delivery to £14 6s. per ton for neutral quality and £13 3s. per ton for ordinary quality, carriage paid.

Export prices remain unchanged at £16 per ton f.o.b., but in certain instances a somewhat lower price has been accepted.

Current Prices

		Chemicals					
		per	£	s.	d.	to	£
		lb.	0	2	3	to	0
Acetic anhydride	ton	95	0	0	0	100	0
Acetone oil	ton	105	0	0	0	110	0
Acetone, pure	ton	65	0	0	0	67	10
Acid, Acetic, glacial, 99-100%	ton	50	0	0	0	52	0
Acetic, 80% pure	ton	100	0	0	0	105	0
Arsenic	ton	69	0	0	0	70	0
Boric, cryst	lb.	0	0	6½	to	0	0
Carbolic, cryst. 39-40%	lb.	0	2	7	to	0	2
Citric	ton	65	0	0	0	70	0
Formic, 80%	lb.	0	4	0	to	0	4
Gallic, pure	lb.	0	0	8½	to	0	0
Hydrofluoric	ton	35	0	0	to	37	10
Lactic, 60 vol.	ton	40	0	0	to	42	10
Nitric, 80 Tw.	ton	41	0	0	to	44	0
Oxalic	lb.	0	0	9½	to	0	10
Phosphoric, 1.5	ton	55	0	0	to	57	0
Pyrogallie, cryst	lb.	0	7	9	to	0	8
Salicylic, Technical	lb.	0	1	0	to	0	1
Salicylic, B.P.	lb.	0	1	5	to	0	1
Sulphuric, 92-93%	ton	8	10	0	to	8	15
Tannic, commercial	lb.	0	3	6	to	0	3
Tartaric	lb.	0	1	8	to	0	1
Alum, lump	ton	18	0	0	to	18	10
Alum, chrome	ton	37	10	0	to	40	0
Alumino ferric	ton	9	0	0	to	9	10
Aluminium, sulphate, 14-15%	ton	12	0	0	to	13	0
Aluminium, sulphate, 17-18%	ton	15	0	0	to	16	0
Ammonia, anhydrous	lb.	0	2	2	to	0	2
Ammonia, .880	ton	43	0	0	to	45	0
Ammonia, .920	ton	30	0	0	to	32	10
Ammonia, carbonate	lb.	0	0	4	to	—	—
Ammonia, chloride	ton	65	0	0	to	70	0
Ammonia, muriate (galvanisers)	ton	50	0	0	to	52	0
Ammonia, nitrate	ton	55	0	0	to	60	0
Ammonia, phosphate	ton	95	0	0	to	100	0
Ammonia, sulphocyanide	lb.	0	3	0	to	0	3

	per	£	s.	d.	to	£	s.	d.
Amyl acetate	ton	420	0	0	to	425	0	3
Arsenic, white, powdered	ton	50	0	0	to	52	0	0
Barium, carbonate, 92-94%	ton	12	10	0	to	13	0	0
Barium, chlorate	lb.	0	0	11	to	0	1	0
Chloride	ton	18	0	0	to	19	0	0
Nitrate	ton	50	0	0	to	52	0	0
Barium Sulphate, blanc fixe, dry... ..	ton	30	0	0	to	31	0	0
Sulphate, blanc fixe, pulp	ton	16	10	0	to	17	0	0
Sulphocyanide, 95%	lb.	0	1	6	to	0	1	0
Bleaching powder, 35-37%	ton	18	0	0	to	19	0	0
Borax crystals	ton	34	0	0	to	36	0	0
Calcium acetate, Brown	ton	12	0	0	to	13	0	0
" Grey	ton	19	0	0	to	21	0	0
Calcium Carbide	ton	29	0	0	to	30	0	0
Chloride	ton	12	10	0	to	13	0	0
Carbon bisulphide	ton	65	0	0	to	67	0	0
Casein, technical	ton	90	0	0	to	92	0	0
Cerium oxalate	lb.	0	3	9	to	0	4	0
Chromium acetate	lb.	0	1	2	to	0	1	4
Cobalt acetate	lb.	0	11	6	to	0	12	6
Oxide, black	lb.	0	16	0	to	—	—	—
Copper chloride	lb.	0	1	3	to	0	1	6
Sulphate	ton	35	0	0	to	37	0	0
Cream Tartar, 98-100%	ton	130	0	0	to	135	0	0
Epsom salts (see Magnesium sulphate)								
Formaldehyde 40% vol.	ton	95	0	0	to	97	10	0
Formusol (Rongalite)	lb.	0	3	9	to	0	4	0
Glauber salts, commercial	ton	6	0	0	to	7	0	0
Glycerine, crude	ton	70	0	0	to	72	10	0
Hydrogen peroxide, 12 vols.	gal.	0	2	8	to	0	2	9
Iron perchloride	ton	45	0	0	to	50	0	0
Iron sulphate (Copperas)	ton	4	0	0	to	4	5	0
Lead acetate, white	ton	50	0	0	to	52	0	0
Carbonate (White Lead)	ton	43	0	0	to	46	0	0
Nitrate	ton	55	0	0	to	57	0	0
Litharge	ton	38	10	0	to	40	0	0
Lithopone, 30%	ton	28	0	0	to	30	0	0
Magnesium chloride	ton	18	0	0	to	19	0	0
Carbonate, light	cwt.	2	15	0	to	3	0	0
Sulphate (Epsom salts commercial)	ton	10	10	0	to	11	10	0
Sulphate (Druggists')	ton	18	10	0	to	19	10	0
Manganese, Borate	ton	70	0	0	to	75	0	0
Sulphate	ton	70	0	0	to	75	0	0
Methyl acetone	ton	95	0	0	to	100	0	0
Alcohol, 1% acetone	ton	145	0	0	to	150	0	0
Nickel sulphate, single salt	ton	60	0	0	to	62	0	0
Nickel ammonium sulphate, double salt	ton	62	0	0	to	64	0	0
Potash, Caustic	ton	36	0	0	to	38	0	0
Potassium bichromate	lb.	0	0	9½	to	—	—	—
Carbonate, 90%	ton	40	0	0	to	42	10	0
Chloride	ton	38	0	0	to	40	0	0
Chlorate	lb.	0	0	8½	to	0	0	9
Meta bisulphite, 50-52%	ton	120	0	0	to	125	0	0
Nitrate, refined	ton	50	0	0	to	52	0	0
Permanganate	lb.	0	1	6	to	0	1	8
Prussiate, red	lb.	0	2	0	to	0	2	1
Prussiate, yellow	lb.	0	1	3	to	0	1	4
Sulphate, 90%	ton	31	0	0	to	33	0	0
Salammoniac, firsts	cwt	3	5	0	to	—	—	—
Seconds	cwt	3	0	0	to	—	—	—
Sodium acetate	ton	30	0	0	to	32	0	0
Arsenate, 45%	ton	60	0	0	to	62	0	0
Bicarbonate	ton	10	10	0	to	11	0	0
Bichromate	lb.	0	0	7	to	0	0	7½
Bisulphite, 80-82%	ton	35	0	0	to	37	10	0
Chlorate	lb.	0	0	5½	to	0	0	5½
Caustic, 70%	ton	24	0	0	to	24	10	0
Caustic, 76%	ton	25	0	0	to	25	10	0
Hydrosulphite, powder, 85%	lb.	0	2	3	to	0	2	6
Hyposulphite, commercial	ton	15	0	0	to	16	0	0
Nitrite, 96-98%	ton	45	0	0	to	46	0	0
Phosphate, crystal	ton	25	0	0	to	27	0	0
Perborate	lb.	0	1	9	to	0	2	0
Prussiate	lb.	0	0	7	to	0	0	7½
Sodium Sulphide, crystals	ton	19	0	0	to	20	0	0
Sulphide, solid, 60-62%	ton	26	0	0	to	30	0	0
Sulphite, cryst.	ton	15	0	0	to	16	0	0
Strontium carbonate	ton	85	0	0	to	90	0	0
Strontium Nitrate	ton	84	0	0	to	90	0	0
Strontium Sulphate, white	ton	8	10	0	to	10	0	0
Sulphur chloride	ton	42	0	0	to	44	10	0
Sulphur, Flowers	ton	19	0	0	to	19	10	0
Roll	ton	19	0	0	to	19	10	0
Tartar emetic	lb.	0	1	10	to	0	2	0
Tin perchloride, 33%	lb.	0	2	6	to	0	3	7
Tin Perchloride, solid	lb.	0	3	0	to	0	3	3
Protochloride (tin crystals)	lb.	0	1	8	to	0	1	9

	per	£	s.	d.	to	£	s.	d.
Zinc chloride, 102 Tw.	ton	22	0	0	to	23	10	0
Chloride, solid, 96-98%	ton	60	0	0	to	65	0	0
Oxide, 99%	ton	45	0	0	to	47	10	0
Dust, 90%	ton	90	0	0	to	92	10	0
Sulphate	ton	21	10	0	to	23	10	0

Coal Tar Intermediates, &c.

Alphanaphthol, crude	lb.	0	4	0	to	0	4	3
Alphanaphthol, refined	lb.	0	4	6	to	0	4	9
Alphanaphthylamine	lb.	0	3	0	to	0	3	3
Aniline oil, drums extra	lb.	0	1	7	to	0	1	8
Aniline salts	lb.	0	1	8	to	0	1	10
Anthracene, 85-90%	lb.	—	—	—	to	—	—	—
Benzaldehyde (free of chlorine)	lb.	0	4	9	to	0	5	0
Benzidine, base	lb.	0	8	6	to	0	9	0
Benzidine, sulphate	lb.	0	9	0	to	0	9	6
Benzic acid	lb.	0	2	3	to	0	2	6
Benzoate of soda	lb.	0	2	3	to	0	2	6
Benzyl chloride, technical	lb.	0	2	0	to	0	2	3
Betanaphthol benzoate	lb.	0	8	0	to	0	8	6
Betanaphthol	lb.	0	2	9	to	0	3	0
Betanaphthylamine, technical	lb.	0	9	6	to	0	10	0
Croceine Acid, 100% basis	lb.	0	5	0	to	0	6	3
Dichlorobenzol	lb.	0	0	9	to	0	0	10
Diethylaniline	lb.	0	6	9	to	0	7	6
Dinitrobenzol	lb.	0	1	5	to	0	1	8
Dinitrochlorobenzol	lb.	0	1	5	to	0	1	6
Dinitronaphthalene	lb.	0	1	6	to	0	1	8
Dinitrotoluol	lb.	0	1	8	to	0	1	9
Dinitrophenol	lb.	0	3	0	to	0	3	3
Dimethylaniline	lb.	0	4	0	to	0	4	3
Diphenylamine	lb.	0	4	6	to	0	4	9
H-Acid	lb.	0	10	0	to	0	10	6
Metaphenylenediamine	lb.	0	5	9	to	0	6	0
Monochlorobenzol	lb.	0	0	10	to	0	1	0
Metanilic Acid	lb.	0	7	6	to	0	8	0
Monosulphonic Acid (2:7)	lb.	0	7	6	to	0	8	0
Naphthionic acid, crude	lb.	0	4	0	to	0	4	3
Naphthionate of Soda	lb.	0	4	3	to	0	4	6
Naphthylamin-di-sulphonic-acid	lb.	0	5	0	to	0	5	6
Nitronaphthalene	lb.	0	1	5	to	0	1	6
Nitrotoluol	lb.	0	1	4	to	0	1	5
Orthoamidophenol, base	lb.	0	18	0	to	1	0	0
Orthodichlorobenzol	lb.	0	1	1	to	0	1	2
Orthotolidine	lb.	0	2	3	to	0	2	6
Orthonitrotoluol	lb.	0	0	10	to	0	1	0
Para-amidophenol, base	lb.	0	12	6	to	0	13	0
Para-amidophenol, hydrochlor	lb.	0	13	0	to	0	13	6
Paradichlorobenzol	lb.	0	0	7	to	0	0	8
Paranitraniline	lb.	0	4	3	to	0	4	6
Paranitrophenol	lb.	0	2	9	to	0	3	0
Paranitrotoluol	lb.	0	5	9	to	0	6	0
Paraphenylenediamine, distilled	lb.	0	13	6	to	0	14	6
Paratolidine	lb.	0	7	6	to	0	8	0
Phthalic anhydride	lb.	0	3	9	to	0	4	0
Resorcin, technical	lb.	0	7	6	to	0	8	0
Resorcin, pure	lb.	0	8	6	to	0	9	0
Salol	lb.	0	2	9	to	0	3	0
Sulphanilic acid, crude	lb.	0	1	4	to	0	1	6
Tolidine, base	lb.	0	8	6	to	0	10	0
Tolidine, mixture	lb.	0	2	9	to	0	3	0

Sulphate of Ammonia Prices

THE British Sulphate of Ammonia Federation, Limited, has just issued its new price list for sulphate of ammonia for home agricultural consumption for July and August delivery. The price is fixed at £14 6s. per ton basis, 25½ per cent. ammonia neutral quality with allowances for lower grades, and, if carriage paid, in lots of 4 tons and upwards to consumer's nearest station or wharf in Great Britain. Special prices will be announced later for Ireland and the Channel Islands.

The Federation draws attention to the fact that this price is based on the lowest price which has been accepted for export, and that these home prices are now fixed on a 25½ per cent., instead of 24½ per cent. ammonia basis. Prices for the rest of the season will be announced later.

Dr. F. G. COTTRELL, chairman of the division of Chemistry and Chemical Technology of the United States National Research Council, is making a tour of Europe in order to prepare a survey of the applications of helium in this Continent. He will also make a special study of oxygen separation and concentration. In this work he is representing the U.S. Bureau of Mines as well as the Research Council.

Company News

PINCHIN, JOHNSON & CO.—Warrants for the usual dividend, at the rate of 6½ per cent. per annum, less tax, on the preference shares for the six months to June 30 were issued on July 1.

BRITON FERRY CHEMICAL AND MANURE.—It is announced that the consideration of the payment of dividends on the ordinary and preference shares has been deferred until the result of the year's working is shown.

NEW TRANSVAAL CHEMICAL CO.—Interim dividends for the half-year to December 3 last of 3 per cent., less tax, on the cumulative first preference shares, and of 4 per cent., less tax, on the cumulative "A" preference shares have been declared.

SOUTH STAFFORDSHIRE MOND GAS (POWER AND HEATING).—The directors announce that, owing to the financial situation, it was not possible to pay on July 1 the dividend on the ordinary and preference shares previously decided upon by resolution.

GERMAN EVAPORATOR COMPANY.—The gross profit for 1920 amounted to 22,594,894 marks, and after providing for all contingencies there remains a net profit of 2,944,644 marks. A dividend at the rate of 18 per cent. for the year has been declared. It is proposed to increase the capital to 10,000,000 marks.

FORSTER'S GLASS CO.—The directors announce a further dividend at the rate of 10 per cent. per annum on the ordinary shares for the half-year, making 10 per cent. for the year; £61,294 is carried forward, subject to excess profits duty and corporation profits tax. Last year a dividend of 7½ per cent. for the year was paid; £17,035 goes to write off the whole of the preliminary expenses, leaving £48,082 to be carried forward, subject to excess profits duty.

SHELL TRANSPORT AND TRADING CO.—At an extraordinary general meeting of shareholders held on Monday, the following resolution was passed unanimously:—"That the capital of the company be increased to £33,000,000 by the creation of 10,000,000 additional ordinary shares of £1 each; and that the board be authorised to issue such shares at such times and upon such terms and conditions, and for such consideration, as they may from time to time determine."

WEBB'S CRYSTAL GLASS.—After transferring £5,259 to reserve for income-tax and corporation profits tax, deducting £6,594 for preliminary expenses, and writing £7,139 off investments, the accounts for ten months to December 31, 1920, show a profit of £43,984, from which must be deducted £13,703 for the preference dividend paid to August 31, 1920, leaving a credit balance of £30,281 to be carried forward. The directors propose to postpone the payment of the preference dividend for the four months to December 31, last.

MAJOR & CO.—Speaking at the general meeting on June 30, Mr. J. L. Major said their freehold land, buildings, and plant had been increased to about £46,000, there having been considerable expenditure for enlargement and improvements. Sundry debtors were about £8,000 higher. Their stock was £2,000 lower, and the investments, which were chiefly in subsidiary companies, were about £36,000 more. Sundry creditors had been reduced by about £48,000, and the reserves had been increased by £15,800, after writing off expenses of the new issue and other items with a view to strengthening the company.

DISTILLERS' CO.—For the year to May 15 last, after providing for depreciation, including investments, for liability under the Finance Acts, and for debenture interest, the accounts show a balance for the year of £415,393, and £100,526 was brought in, making £515,919. It is proposed to place to reserve, £100,000 (making it £600,000), and to fire insurance fund, £5,000 (making it £140,000); and after paying preference dividend, less tax, the directors recommend a further dividend of 6 per cent. on the ordinary shares, free of tax, making 10 per cent. for the year, leaving to be carried forward £108,994. Meeting, 12 Torphichen Street, Edinburgh, July 15, at 1.

LEVER BROTHERS, LTD.—Dealings in the following securities have been specially allowed by the Committee under Rule 148a. These securities will rank *pari passu* with those in which special settling days have already been appointed, as soon as they are identical and the certificates are ready for distribution, and with those for which an official quotation has already been granted as soon as they are identical and are officially quoted:—435 seven per cent. preference shares of £1 each, fully paid, Nos. 23,558,165 to 23,558,599; and

270 eight per cent. "A" preference shares of £1 each, fully paid, Nos. 15,467,309 to 15,467,578. With regard to the statement which has recently been appearing in certain sections of the Press to the effect that the Company are about to make a fresh public issue of Debenture stock, it is announced that the matter is not at present under consideration by the Company.

SAN SEBASTIAN NITRATE CO.—The gross profit for 1920, including interest and transfer fees, amounted to £45,919, from which has to be deducted expenses incurred during the stoppage from January to March, 1920, £4,903, London office charges, £2,000, and taxes reserve account, £2,000, leaving a net profit of £37,016. From this has to be deducted a debit balance brought in of £25,650, leaving £11,366, which the directors propose to carry forward. The oficina was reopened in April, 1920, after having been closed since January, 1919. The quantity of nitrate produced in the period April 7 to December 31, 1920, was 236,195 quintals. Profit has been taken in the accounts on 169,715 quintals, and the balance of 66,480 quintals has been valued in the balance-sheet at cost. The bulk of this stock is under contract for 1921 delivery at a satisfactory price. Meeting, Winchester House, July 14, noon.

BENZOL & BY-PRODUCTS, LTD.—The accounts from the incorporation of the company to the end of the first financial period (Aug. 31 last), show a credit to profit and loss of £27,532. Setting aside £10,000 as a provision for income tax, excess profits duty and corporation tax, a net profit of £17,532 remains. Preference dividend to Aug. 31 last has been paid, leaving £7,813, which has been carried forward. The whole of the preliminary expenses, amounting to £20,384, have been written off, and ample provision for depreciation has been made. In spite of the disastrous strike of October and November last, the company's business on the whole has steadily progressed, and up to the present the directors are able to say that the profits for the current year are likely to exceed those to Aug. 31, 1920. The directors have paid an interim dividend to March 31 last on the preference shares at the rate of 10 per cent. for the year. Meeting, 15, Grosvenor Place, S.W., July 15, at 12.15.

Chemical Trade Inquiries

The following inquiries, abstracted from the "Board of Trade Journal," have been received at the Department of Overseas Trade (Development and Intelligence), 35, Old Queen Street, London, S.W.1. British firms may obtain the names and addresses of the inquirers by applying to the Department (quoting the reference number and country), except where otherwise stated.

LOCALITY OF FIRM OR AGENT.	MATERIALS.	REF. No.
Australia ...	Oil. Replies to the Department of Overseas Trade (Room 59), 35, Old Queen Street, London, S.W.1.	—
Sydney, N.S.W.	Glassware. Replies to the Official Secretary, Commonwealth of Australia, Commercial Bureau, Australia House, Strand, London, W.C.1.	—
Marseilles ...	Oil Seeds	766
Lyons ...	Bichromate of soda; sulphate of sodium.	767

Tariff Changes

AUSTRALIA.—The Commonwealth tariff on varnishes, oil and wood finishes, petrifying liquids, and liquid dryers is amended to 2s. 6d. per gallon or 25 per cent. *ad valorem*, whichever rate returns the higher duty.

MOROCCO (FRENCH ZONE).—The export of phosphates from the French Zone of Morocco is to be permitted without restriction as to quantity or price.

SWITZERLAND.—A supplement to the Board of Trade Journal (June 30) contains the text of a new provisional Customs tariff containing revised rates of Customs duty on chemicals; dyes and colours; fats, oils and wax for industrial purposes; mineral oils, tar oils, and resinous oils; and soaps.

TUNIS.—The prohibition on the export from Tunis of soaps (other than scented soaps) is now withdrawn.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

London Gazette

Partnerships Dissolved

HANNA, H., and KAFETZ, K., carrying on business as skin dressers and dyers, at 2A, Sigdon Road, Hackney, London, E., under the style of Hanna & Kafetz, by mutual consent as from June 20, 1921. All debts will be received and paid by H. Hanna.

Bankruptcy Information

JOWETT, F. J., 3, Russell Square, Brighton, and 24, Middle Street, Brighton, lately carrying on business at 31 & 33, Broad Street House, London, formerly trading as The City & Midland Manufacturing Co., and now trading as the National Manufacturing Co., chemical manufacturer. Court, Brighton and Lewes. Date of Receiving Order, June 28, 1921. No. of Receiving Order, 19. Creditors' Petition.

First Meetings and Public Examinations

CALVERT DYES, LTD., Steanard Lane, Mirfield, Yorks. High Court of Justice. Creditors meeting, July 14, 1921, at 11.30 a.m., offices of the Official Receiver, 12, Duke Street, Darley Street, Bradford, Yorks. Contributories' meeting, July 14, 1921, at 12 noon, at the above address. TOWNSEND, B. J., 477, Stanton Road, Stapenhill, Burton-on-Trent, and JOHNSON, B. C. (whose present address is unknown), trading in co-partnership under the style of The Trent Soap & Chemical Company, at Bank Square, Burton-on-Trent, Stafford, chemical manufacturers. Court, Burton-on-Trent. Date of first meeting, July 14, 1921, 3.30 p.m., Official Receiver's offices, 4, Castle Place, Nottingham. Date of Public Examination, July 27, 1921, 11.30 a.m. Court House, Station Street, Burton-on-Trent.

Notice of Dividend

UMPLEBY, S. S., 4, Portland Terrace, Coatham, Redcar, Yorks, and carrying on business at 201, Linthorpe Road, Middlesbrough, chemists' manager. £—11½d. First and final. July 14, 1921, at the Official Receiver's offices, 80, High Street, Stockton-on-Tees.

Application for Discharge

BURFORD, J. F., 143, Drummond Road, Bermondsey, London, lately carrying on business in partnership with W. W. Burford, C. J. Burford, R. A. Burford and E. E. Burford, under the style of S. & E. Burford & Brothers, at Drummond Road, Bermondsey, London, salt dealer. High Court of Justice. July 27, 1921, 11 a.m., at the Bankruptcy Buildings, Carey Street, London, W.C. 2.

Companies Winding Up Voluntarily

ANGLO-NORWEGIAN ELECTRO-CHEMICAL & FINANCE CO., LTD., Mr. E. Dyball, 6, Great St. Helens, London, E.C., Liquidator.

HOLLINWOOD CHEMICAL CO., LTD.—Mr. R. Berg, Anfield House, Victoria Park, Manchester, Liquidator.

SOUTH-EASTERN MARGARINE CO., LTD. (in voluntary liquidation).—A meeting of creditors will be held at the offices of Mr. E. Woodroffe, 9-10, Pancras Lane, Queen Street, London, E.C.4, at 3.30 p.m., on Monday, July 11, 1921. Creditors' claims on or before August 15, 1921, to Mr. E. Woodroffe, Liquidator, at the above address.

Liquidators' Notices

CARDIFF HEMATITE IRON ORE CO., LTD.—A general meeting of members will be held at the registered office, Western Mail Chambers, Cardiff, on Tuesday, August 9, 1921, at 10.30 a.m. Edward T. Granger, Liquidator.

LONDON BRONZE & METAL FOUNDRY, LTD. (in liquidation).—A general meeting will be held at 2, Billiter Avenue, Billiter Street, London, E.C., on Wednesday, August 3, 1921, at 4 p.m.

Mortgages and Charges

[NOTE.—The Companies Consolidation Act, of 1908, provides that every Mortgage or Charge, as described therein, created after July 1, 1908, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every Company shall, in making its Annual Summary, specify the total amount of debts due from the Company in respect of all Mortgages or Charges which would, if created after July 1, 1908, require registration. The following Mortgages and Charges have been so registered. In each case the total debt, as specified, in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced since such date.]

ACME CHEMICAL CO., LTD., Tonbridge.—Reg. June 24, £2,000 mortgage, to Mrs. E. Dann, 29, Ashdell Road, Broom Hill, Sheffield; charged on land, factory, &c., with fixed trade machinery, at Tonbridge. *£850. May 4, 1921.

ELTON COP DYEING CO., LTD., Bury.—Reg. June 25, debentures securing all moneys not exceeding £80,000 which mortgages may be called upon to pay under their guarantee to the Company's bankers, to J. Brandwood, Brandesholme, Bury, manufacturer and others; general charge. *£30,000. August 10, 1920.

MARLEY HILL CHEMICAL CO., LTD., Newcastle-on-Tyne.—Reg. June 27, £10,000 first debentures, part of £100,000; general charge.

METAL CASTINGS, LTD., London, W.—Reg. June 24, £10,000 first debentures, to Lloyds Bank, Ltd.; general charge. *£20,600. January 13, 1921.

METAL GRAVURE CO., LTD., London, E.C.—Reg. June 23, £500 debentures; general charge. *—November 1, 1920.

Satisfaction

ACME CHEMICAL CO., LTD., Tonbridge.—Satisfaction reg. June 22, £500, balance of amount outstanding July 1, 1908.

County Court Judgments

[NOTE.—The publication of extracts from the "Registry of County Court Judgments" does not imply inability to pay on the part of the persons named. Many of the judgments may have been settled between the parties or paid. Registered judgments are not necessarily for debts. They may be for damages or otherwise, and the result of bona-fide contested actions. But the Registry makes no distinction of the cases. Judgments are not returned to the Registry if satisfied in the Court books within twenty-one days. When a debtor has made arrangements with his creditors we do not report subsequent County Court judgments against him.]

BARLOW, S. ROSE., Perranporth, chemist. £13 2s. 8d. May 24.

GERRING, C., New Romney, Kent, chemist. £18 11s. 6d. May 25.

MOORHEADS, LTD., R. O., 37, High Street, Sheerness, chemists. £31 15s. 7d. May 19.

ROWLAND & CO., 71/3, Vauxhall Road, Liverpool, druggists. £27 2s. 6d. May 17.

SUGDEN, WM. & A., 19, Todd Street, Bury, dyer. £13 11s. May 26.

DAVIDSON, J., 22, Leazes Terrace, Newcastle-on-Tyne, drysalter. £18 15s. 4d. May 10.

NEWMAN, A. P., 51, Thomas Street, Barry Dock, chemist. £15 16s. 8d. May 26.

Basic Slag and Raw Phosphate

MR. E. ULLYOTT, manager of the Leeds Phosphate Works, Ltd., in a communication to the *Yorkshire Post*, writes: "Most of the raw phosphate existing in the world owes its origin to birds, and if one variety can be truthfully described as a guano phosphate so can others. It is no good applying phosphates unless they are assimilable in the soil. Without chemical treatment the phosphates in some descriptions of raw phosphate are so slowly assimilable as to be almost useless as a fertiliser. This has been proved in various parts of the globe. Whilst some have given good results, it has been admitted that none has proved as efficacious as the tetrabasic phosphate in basic slag. The best combination, therefore, is one in which the phosphatic units will be derived in a larger proportion from basic slag than from raw phosphate. Particularly should farmers beware of a mixture of phosphate rock with slag which is not basic slag at all and has no fertilising value whatever, but may simply be incorporated with raw phosphate to increase the bulk."

New Companies Registered

The following list has been prepared for us by Jordan & Sons, Ltd., company registration agents, 116 and 117, Chancery Lane, London, W.C.2 :—

SHEPPERLEYS, MANUFACTURING CHEMISTS, LTD., Wholesale & retail chemists and druggists. Nominal capital £30,000 in 20,000 preferred shares and 10,000 ordinary shares of £1 each. Directors : J. R. Hex, P. B. Symonds, J. E. Shaw, G. Middleweek. Qualification of directors, £500.

WALESWOOD COKING CO., LTD., Waleswood Collieries, near Sheffield. Manufacturers of coke and residuals or by-products of coal. Nominal capital, £100,000 in 100,000 shares of £1 each. Directors : J. H. Ashton, A. E. Bond, A. Thompson, S. C. Skinner. Qualification of directors, 1 share.

THOMAS CLARKE & SONS (CLARDYE), LTD. Dyers, finishers, &c. Nominal capital, £25,000 in 21,000 ordinary shares and 4,000 preference shares of £1 each. Director : A. B. Clarke. Qualification of directors, 250 shares.

SUPER ENAMELS, LTD., 30 & 31, St. Swithins Lane, London E.C.4. Manufacturers of and dealers in enamels, paints, varnishes, distempers, dyes, and all other colouring materials. Nominal capital, £2,250 in 1,500 "A" shares of £1 each, and 750 "B" shares of £1 each. Directors : A. Earle, J. C. Hayes, C. H. Iverson, G. Sparrow. Qualification of directors, £150.

JAMES JOHNSTONE & CO., LTD., Abbey Hey Lane, Gorton, Manchester. Chemists, druggists, oil and colour men, &c. Nominal capital, £2,000 in 2,000 shares of £1 each. Directors : James Johnstone and John Johnstone. Qualification of directors, £50.

MORGAN BROTHERS (CHEMISTS), LTD., 1, Strand Buildings, Ystradmynock, Glam. Chemists and druggists. Nominal capital, £2,000 in 2,000 ordinary shares of £1 each. Directors to be appointed by subscribers. Qualification of directors, 1 share.

CHEMISTS' SUPPLY CO., LTD., 127, Malmesbury Park Road, Bournemouth, Hants. Wholesale chemists and druggists. Nominal capital, £5,000 in 5,000 shares of £1 each. Directors : J. A. King, D. F. Jones, R. A. Ronchetti.

SEABOARD OIL CORPORATION, Dashwood House, 9, New Broad Street, E.C.2. Incorporated in New York, U.S.A. To acquire, refine and otherwise dispose of mineral, vegetable or other oils and petroleum, and all its products. Nominal capital, 1,000 dollars. Name of person authorised to accept service : William Riggins Glass, Dashwood House, 9, New Broad Street, London, E.C.2. (Engineer).

CRUSADER REVIVER COMPANY, LTD., Langham Place, Northampton. Manufacturers of inks, stains, dyes, &c. Nominal capital, £1,000 in 1,000 shares of £1 each. Directors : W. L. Simmons, R. Barratt, G. Pragnell, W. H. Henton, C. D. Henry. Qualification of directors, 100 shares.

EGYPTIAN CENTRAL OILFIELDS, LTD., 264/273, Salisbury House, London Wall, E.C.2. Oil producers and oil well proprietors and refiners. Nominal capital, £75,000 in 75,000 shares of £1 each. Minimum subscription, 7 shares. Directors : J. F. Dalglish (chairman), L. R. Davies, E. Rowley. Qualification of directors, £100. Chairman, £200 each. Chairman, £300.

ENDURITE (1920), LTD. Manufacturers and dealers in oils and varnishes and colours. Nominal capital, £7,500 in 5,000 ordy. shares, and 2,500 cum. 7 per cent. par. pref. shares of £1 each. Directors : H. H. Humphries (chairman), H. P. Williams. Qualification of directors, 100 shares.

HOCKIN (A. W.), LTD., 133, Western Road, Hove, Sussex. Chemist and druggist. Nominal capital, £1,500 in 1,500 shares of £1 each. Directors : A. W. Hockin, J. Van Koert. Qualification of directors, £100.

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RELIABLE PRODUCTS CO., LTD., Percy Street, Pendleton, Lancashire. Manufacturers and dealers in paste, paste powders, sizes and glues, &c. Nominal capital, £1,000 in 1,000 shares of £1 each. Directors : J. G. G. Mellor, W. Duncan.

SIMPSON'S (LONGSIGHT), LTD., 920, Stockport Road, Longsight, Manchester. Chemists and druggists. Nominal capital, £500 in 500 shares of £1 each. Directors : J. S. Simpson, C. Simpson.

Government Contracts

THE following were among the Government contracts let during April :—

ADMIRALTY.—Carbon, Tetrachloride : Pyrene Co., Ltd., London S.W. Carbon Rods : Morgan Crucible Co., Ltd., London, S.W. Calomel, Cream : Evans, Sons, Lescher & Webb, Ltd., London, E.C. Electrodes : Quasi-Arc Co., Ltd., London, E.C. Paint, White Lead : Brimsdown Lead Co., Ltd., Brimsdown ; J. S. Craig & Co., Ltd., Glasgow ; Cookson & Co., Ltd., Newcastle-on-Tyne ; H. Grace & Co., London, E. ; Locke, Lancaster, & W. W. & R. Johnson & Sons, Ltd., London, E.C. ; Mersey White Lead Co., Ltd., Warrington ; Walkers, Parker & Co., Ltd., Chester. Red Lead : Walkers, Parker & Co., Ltd., Chester.

WAR OFFICE.—Carbon Tetrachloride : The Webb Lamp Co., Ltd., Birmingham. Creosote : Gas Light & Coke Co., London, S.W. Crucibles : The Morgan Crucible Co., Ltd., London, S.W. Methylated Spirit : Davis Brothers, Ltd., South Hackney, E. Oil, Linseed, Raw : Younghusband, Barnes & Co., Ltd., London, S.E. Oil, Lubricating : Prices Co., Ltd., Belvedere, Kent.

AIR MINISTRY.—Aviation Spirit : Shell Mex, Ltd., London, W.C. Furnace Fuel Oil : Anglo-American Oil Co., Ltd., London, E.C.

POST OFFICE.—Methylated Spirit : Jones & Co., London, E. Wood Wool : Bryant & May, Ltd., Liverpool.

HIGH COMMISSIONER FOR INDIA.—Paint : Ripolin, Ltd., London, W. ; Brimsdown Lead Co., Ponders End.

CROWN AGENTS FOR THE COLONIES.—Cement : Cement Marketing Co., London, E.C. Drugs, &c. : Howards & Sons, Ltd., Ilford, Essex. Dynamite : Nobel Industries, Ltd., London, W. Glass Bottles : Baird & Tatlock (London), London, E.C. Laboratory Apparatus : Baird & Tatlock, Ltd., London, E.C. Novarsenobillon : May & Baker, Ltd., London, S.W. Paint : Torbay & Dart Paint Co., London, E.C. Tonite : Curtis's & Harvey, Ltd., London, E.C.

German Reparation Levy

Date of Refund Fixed

THE Chemical and Dyestuff Traders' Association, in reply to representations respecting the uncertainty prevailing among German exporters as to the refund to them of the 26 per cent. levy on German goods imported into the United Kingdom, has received an official communication from the Foreign Office stating :—

"With reference to your letter of the 15th instant, inquiring whether the German Government has officially undertaken to reimburse to the German exporter the amount of the 26 per cent. duty paid, under the German Reparation Recovery Act, upon German goods imported into this country, I am directed by Earl Curzon of Kedleston to inform you that an official statement has been issued by the German Ministry of Finance to the effect that the German Government will reimburse this amount to German exporters as from May 12 last.

"It is understood that, upon the production of a British certificate showing the amount retained by the British Authorities, and upon receipt of the necessary details from the exporter, payment will be made in German currency at the rate of exchange which prevailed on the day when the British authorities issued the certificate.

"The point which you raise as to the application of the export levy of 26 per cent. to all goods consigned to neutral countries is under consideration."

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